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Infinity

Beta™ SW Series

CSW-10 Subwoofer

SERVICE MANUAL

Infinity Systems, Inc.
250 Crossways Park Dr.
Woodbury, New York 11797

Rev1 9/2004

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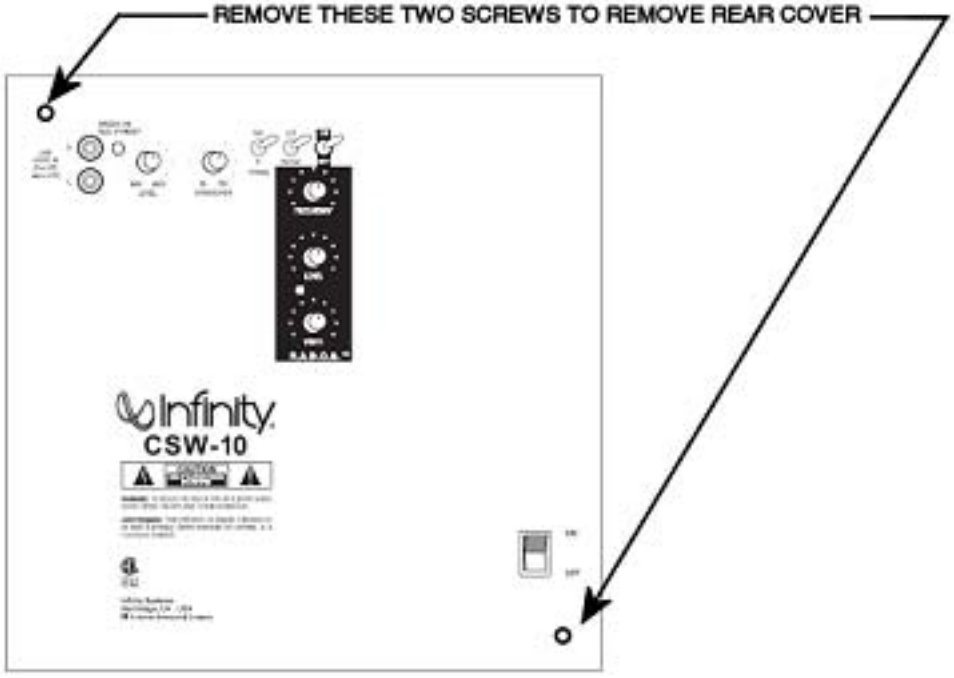
Basic Specifications
CSW-10 Powered Subwoofer

Frequency Range:	22Hz – 150Hz (-3dB)
	20Hz – 150Hz (-6dB)
Max Amplifier Output:	650 watts RMS
Low-Frequency Driver:	10" (254mm) C.M.M.D.
Crossover Frequency:	50 -150 Hz (24dB/octave, continuously variable)
Dimensions (H x W x D):	14" x 13-1/4" x 15-3/8"
	(356mm x 337mm x 391mm)
Weight:	52 lb (23.6 kg)

Infinity continually strives to update and improve existing products, as well as create new ones. The specifications and construction details in this and related Infinity publications are therefore subject to change without notice.

CSW-10	450W Powered Sub/ Plate Amp				
LINE VOLTAGE	**Yes/No**	**Hi/Lo Line**	**Nom.**	**Unit**	**Notes**
US 120VAC/60Hz	Yes	108-132	120	Vrms	Normal Operation
EU 230VAC/50-60Hz	Yes	207-264	230	Vrms	Normal operation, MOMS required
Parameter	**Specification**	**Unit**	**QA Test Limits**	**Conditions**	**Notes**
Amp Section					
Type (Class AB, D, other)	D	n/a	n/a		Bridge type amplifier, None of the speaker terminals must be connected to system GND at any time.
Load Impedance (speaker)	4	Ohms	n/a	Nominal	
Rated Output Power	450	Watts	425	1 input driven	
THD @ Rated Power	0.5	%	1	22K filter	
THD @ 1 Watt	0.1	%	0.2	22K filter	
Dynamic Power	450	Watts	430	Power is the average measurement of the first four consecutive peaks of the burst signal	3/20 Cycles @ 50 Hz, burst test into 4 Ohms, input driven 6dB above its maximum sensitivity, volume level at Maximum, RABOS Section OFF
DC Offset	80	mV-DC	100	@ Speaker Outputs	
Damping factor	>20	DF	15	Measured at amplifier board	Measured at the speaker cable. 200 Watts, measured at speaker output terminals located at the amp board.
Input Sensitivity					
Input Frequency	50	Hz	30	Nominal Freq.	
Left or Right inputs	10.29	mVrms	±2dB	To 1 Watt	Single input driven, Ap Zo=600 Ohms, LP ON, RABOS OFF, Volume ctrl & crossover at max
Left & Right with LFE or LP filter OFF Mode selected	10.17	mVrms	±2dB	To 1 Watt	Single input driven , Ap Zo=600 Ohms, LP OFF, RABOS OFF, Volume ctrl & crossover at max
Speaker/Hi Level Input	158	mVrms	±2dB	To 1 Watt	Single input driven, Ap Zo=25 Ohms, Normal, RABOS OFF, Volume ctrl & crossover at max
Signal to Noise					
SNR-A-Weighted	100	dBA	95	Relative to rated power (400 Watts)	A-Weighting filter
SNR-unweighted	95	dBr	90	Relative to rated power (400 Watts)	22K filter
SNR rel. 1W-unweighted	70	dBr	65	Relative to 1W Output	22K filter
Residual Noise Floor	0.5	mVrms	1	Volume @max, using RMS reading DMM/VOM (or A/P)	
Residual Noise Floor	0.5	mVrms(max)	1	Volume @max, w/ A/P Swept Bandpass Measurement (Line freq.+ harmonics)	
Input Impedance					
Line Input (L, R,LFE)	10K	ohms	n/a	Nominal	
Speaker/Hi Level Input	10K	ohms	n/a	Nominal	
Filters					
LP 4th order variable	50-150	Hz	± 10		Refer to AP graph 1
Subsonic filter (HPF) 3rd Orde	Fixed	Hz	± 10		Refer to AP graph 1
Low pass filter OFF	Fixed	Hz	± 10	L or R input driven, LP Filter OFF	Refer to AP graph 1
BOS					
Frequency Control		--			
Range	20-80	Hz	functional	21 detent pot (0.1 oct. steps)	Refer to AP graph 2
Level Control		--	--		
Range	-14.1 to 0	dB	functional	21 detent pot (0.5dB steps)	Refer to AP graph 3
Width(Q) Control		--	--		
Range	4.5% to 49.5%	octave	functional	21 detent pot (5steps/0.1 octave)	Refer to AP graph 4
Limiter					
THD at Max. Output Power	YES	n/a	functional		
Features	--				
Auto - On -Off	YES	--	functional		No switch to select the ATO mode is provided, Refer to ATO section
Phase switch	0-180	deg	functional		
Volume pot Taper (lin/log)	LOG	--	functional		A Taper
Variable crossover 50-150 Hz	YES		functional		4th Order LP Filter, 2nd order fix and 2nd order variable.
HP Speaker out	YES		functional		Pass through from the speaker input section
LP On- Off Select switch	YES	--	functional		Disables LP filter, intended for LFE
Input Configuration					
Line In (L,R) & LFE	YES	--	functional		Dual RCA jack, L or R is used in LFE mode
Spkr/Hi Level In	YES	--	functional		Binding post connector L&R

Parameter	Specification	Unit	QA Test Limits	Conditions	Notes
Signal Sensing (ATO)					
Auto-Turn-On (yes/no)	YES		functional	Auto - on selection switch in Auto	
ATO Input test frequency	50	Hz	functional	"	
ATO Level LFE Input	2.5	mV	functional	"	
ATO Level Speaker in	30	mV	functional	"	
ATO Turn-on time	2	seconds	functional	Amp connected and AC on, then input signal applied	
Auto Mute/ Turn-OFF Time	15	minutes	17	(T) Time before muting, after input signal is removed	Auto turn of time (T) must be 10 > T < 17 Minutes
Power on Delay time	2	sec.	4	AC Power Applied	
Transients/Pops					
ATO Transient	5	mV-peak	n/a	@ Speaker Outputs	
Turn-on Transient	50	mV-peak	1V-pk-pk	@ Speaker Outputs	AC Line cycled from OFF to ON
Turn-off Transient	50	mV-peak	1V-pk-pk	@ Speaker Outputs	AC Line cycled from ON to OFF
Efficiency					
Efficiency	68	%	65	400W of output power	Nominal Line voltage 120 VAC
Stand-by Input Power	18		20	@ nominal line voltage, Amp in OFF state, RED LED activated	Maximum allowable input power LED in RED, Class D inactive
Stand-by Input Power	22	Watts	25	@ nom. line voltage, Amp in On state, Green LED activated	Maximum allowable input power under nominal Input voltage and frequency, in stand-by mode (HOT or COLD operation, LED GREEN). Class D active but no signal applied.
Power Cons. @ 400W	584	Watts	615	@ nom. line voltage	400 Watts into 4 Ohms nominal line voltage
Protection					
Short Circuit Protection	NO		N/A		
Thermal Protection	YES		functional	@1/8 max unclipped Power	Temperature rise in accessible metal parts should not exceed 35K rise for domestic version or 30K rise for European versions (refer to requirements sheet). Unit is protected for over-temperature conditions
DC Offset Protection	YES		-	DC present at Speaker Out leads	Relay opens during a DC output condition
Line Fuse Rating					
USA-Domestic	5	Amps		Type-T or Slo Blo-250 V	
EU	2.5	Amps		Type-T or Slo Blo-250 V	Internal fuse with UL/SEMKO rated holder



Controls and Connections

Rear Panel

❶ Line-Level Inputs

❷ Power Indicator

❸ Subwoofer Level (Volume) Control

❹ Crossover Adjustment

❺ Phase Switch

❻ Normal/LFE Selector

❼ Power Switch

Bass Optimization Controls (see page 5)

❽ Bass Optimization System Selector

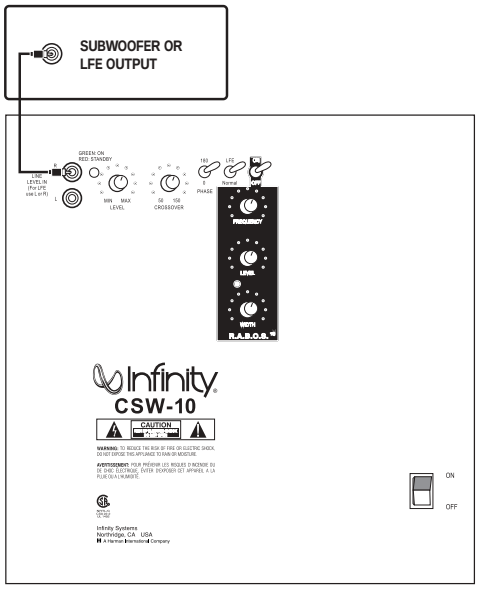
❾ Center-Frequency Adjustment

❿ Bass Optimization System Level Adjustment

⓫ Bass Optimization System Bandwidth Adjustment

CONNECTIONS

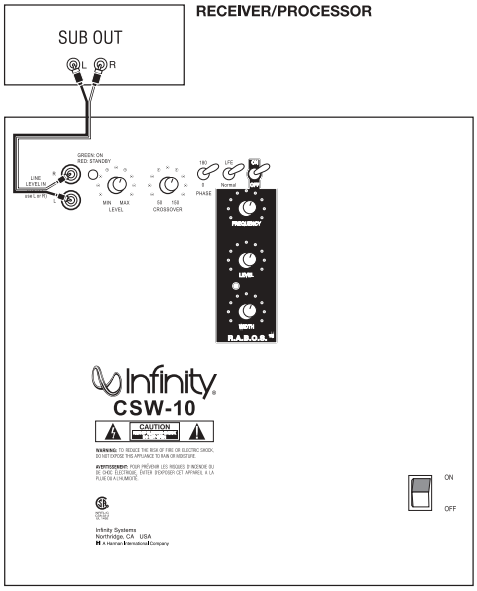
If you have a Dolby* Digital or DTS® receiver/processor with a low-frequency-effects (LFE) output:



• Set Normal/LFE Switch to LFE.

NOTE: In this case, you do not need to use a Y connector. Simply connect the LFE output on your receiver/processor to either the left or right input on the subwoofer.

If your receiver/processor has subwoofer outputs for the left and right channels:



• Set Normal/LFE Switch to Normal.

NOTE: Some receivers have a single subwoofer output (do not confuse this with a single LFE output as described to the left). In that case, it is recommended that you use a Y connector (not included) to maximize performance.

OPERATION

Power On

Plug your subwoofer's AC cord into a wall outlet. Do not use the outlets on the back of the receiver.
Initially set the Subwoofer Level (Volume) Control ❸ to the "min" position.
Turn on your sub by pressing the Power Switch ❼ on the rear panel.

Auto On/Standby

With the Power Switch ❼ in the ON position, the Power Indicator LED ❷ will remain backlit in red or green to indicate the On/Standby mode of the subwoofer.

RED = STANDBY (No signal detected, Amp Off)
GREEN = ON (Signal detected, Amp On)

The subwoofer will automatically enter the Standby mode after approximately 10 minutes when no signal is detected from your system. The subwoofer will then power ON instantly when a signal is detected. During periods of normal use, the Power Switch ❼ can be left on. You may turn off the Power Switch ❼ for extended periods of nonoperation, e.g., when you are away on vacation.

Adjust Gain

Turn on your entire audio system and start a CD or movie soundtrack at a moderate level. Turn up the Subwoofer Level (Volume) Control ❸ about half way. If no sound emanates from the subwoofer, check the AC-line cord and input cables. Are the connectors on the cables making proper contact? Is the AC plug connected to a "live" receptacle? Has the Power Switch ❼ been pressed to the "On" position? Once you have confirmed that the subwoofer is active, proceed by playing a CD, record or cassette. Use a selection that has ample bass information.

Set the overall volume control of the preamplifier or stereo to a comfortable level. Adjust the Subwoofer Level (Volume) Control ❸ until you obtain a pleasing blend of bass. Bass response should not overpower the room but rather be adjusted so there is a harmonious blend across the entire musical range. Many users have a tendency to set the subwoofer volume too loud, adhering to the belief that a subwoofer is there to produce lots of bass. This is not entirely true. A subwoofer is there to enhance bass, extending the response of the entire system so the bass can be felt as well as heard. However, overall balance must be maintained or the music will not sound natural. An experienced listener will set the volume of the subwoofer so its impact on bass response is always there but never obtrusive.

Crossover Adjustments

NOTE: This control will have no effect if the Normal/LFE Selector Switch ❻ is set to "LFE." If you have a Dolby Digital or DTS processor/receiver, the Crossover Frequency is set by the processor/receiver. Consult your owner's manual to learn how to view or change this setting.

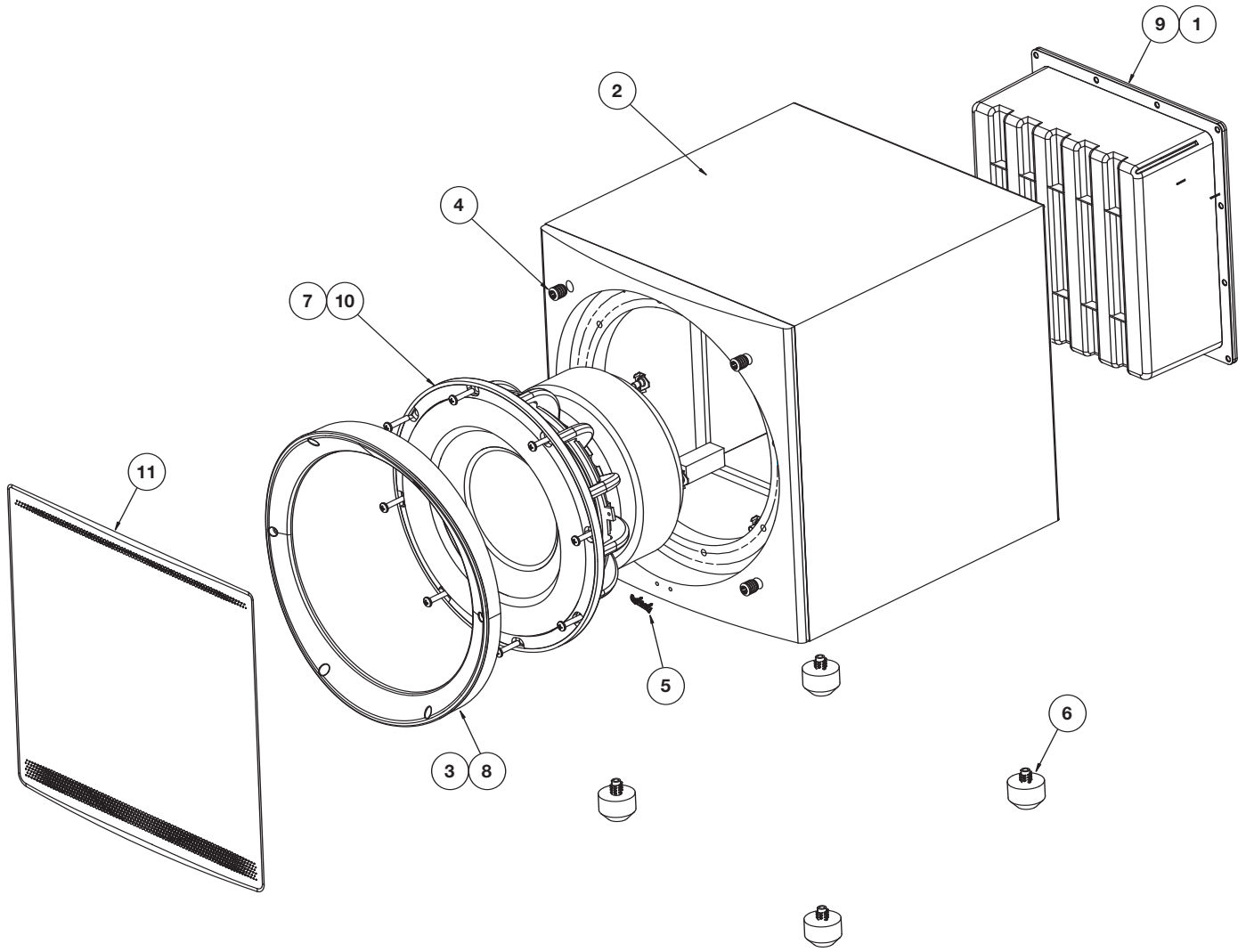
The Crossover Adjustment Control ❹ determines the highest frequency at which the subwoofer reproduces sounds. If your main speakers can comfortably reproduce some low-frequency sounds, set this control to a lower frequency setting, between 50Hz and 100Hz. This will concentrate the subwoofer's efforts on the ultradeep bass sounds required by today's films and music. If you are using smaller bookshelf speakers that do not extend to the lower bass frequencies, set the Crossover Adjustment Control to a higher setting, between 120Hz and 150Hz.

Phase Control

The Phase Switch ❺ determines whether the subwoofer speaker's piston-like action moves in and out with the main speakers, 0˚ or opposite the main speakers, 180˚. Proper phase adjustment depends on several variables such as room size, subwoofer placement and listener position. Adjust the phase switch to maximize bass output at the listening position.

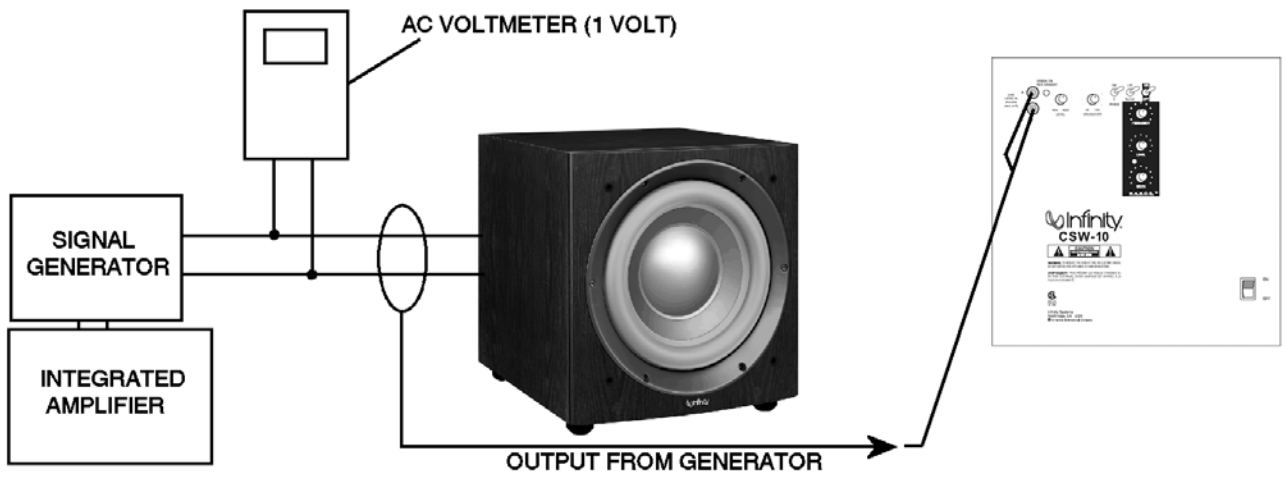
CSW-10

EXPLODED VIEW



ITEM NO.	DESCRIPTION	QTY.	PART NO.
1.	CSW-10 Amplifier	1	Not for Sale
2.	CSW-10 Cabinet	1	Not for Sale
3.	Trim Ring, 10” CSW-10 (Black)	1	352438-001
	Trim Ring, 10” CSW-10 (Beech/Cherry)	1	352438-002
4.	Cup, Grille (Black)	4	333249-001
	Cup, Grille (Beech/Cherry)	4	333249-003
5.	Logo CSW-10	1	351617-001
6.	Foot Assembly, Rubber, Blk w/Threaded Insert	4	338037-002
7.	DD Screw (woofer), 10-32 x 1 FIL	8	21754
8.	Screw (trim ring) #8 x 1”, PB, HXS, ZINC	6	903802-016
9.	Screw (amplifier) #8 x 1”, PB, PPH, BLK	12	900101-016
10.	Woofer, 10” Sub DCR=3.4 ohms ±10%	1	351508-001
11.	Grille Assembly, Frnt CSW-10 (Black)	1	352332-003
	(Beech/Cherry)	1	352332-004

CSW-10 Test Set Up and Procedure



SYSTEM AURAL SWEEP TEST

Equipment needed:

- Function/signal generator/sweep generator
- Integrated Amplifier
- Multimeter
- RCA cables

General Unit Function (UUT = Unit Under Test)

Switches/knobs on the amplifier faceplate:

Crossover Frequency Adjust full CW (150Hz)
Phase switch – either position
RABOS On/Off switch – OFF
LFE switch - Normal

1. Remove the subwoofer grille.
2. From the signal generator, connect both right and left line level inputs (RCA jacks) – to signal generator and UUT. Use Y-cable if necessary from mono source.
3. On the amplifier, turn the LEVEL control full Counterclockwise (Min).
4. Turn on generator, adjust to **100mV, 50 Hz**.
5. Plug in UUT; turn the power switch ON. Turn LEVEL control full Clockwise (Max).
6. LED should now be Green; aggressive bass response should be seen from woofer – near maximum excursion.

Sweep Function

1. Follow steps 1-6 above, using a sweep generator as a signal source.
2. Sweep generator from 20Hz to 1kHz. Listen to the cabinet and drivers for any rattles, clicks, buzzes or any other noises. If any unusual noises are heard, remove woofer and test.

Driver Function (Woofer)

1. Remove woofer from cabinet; detach + and - wire clips.
2. Check DC resistance of woofer; it should be **3.4 ohms** ±10%.
3. Connect a pair of speaker cables to driver terminals. Cables should be connected to an integrated amplifier fed by a signal generator. Turn on generator and adjust so that speaker level output is **5.0**V.
4. Sweep generator from 20Hz to 1kHz. Listen to driver for any rubbing, buzzing, or other unusual noises.

Service Bulletin

Service Bulletin INF2004-02 – September 2004

This is considered a Minor repair

To: All Infinity Service Centers

Model: Beta CSW-10

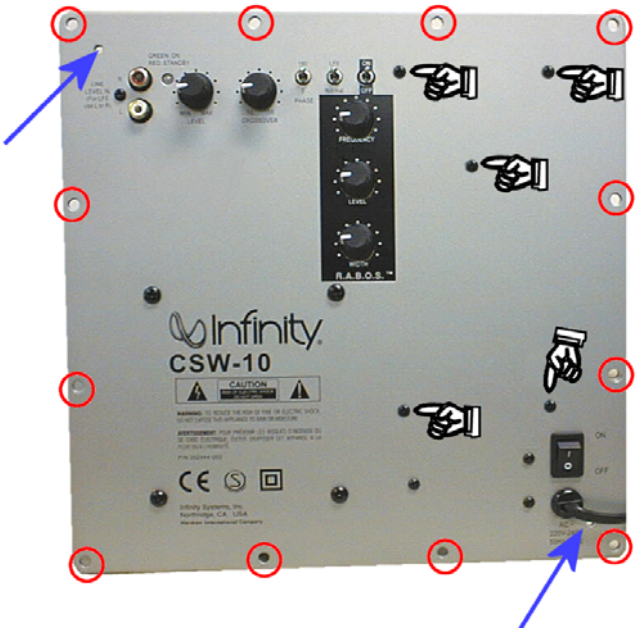
Subject: Premature Limiting

A small number of CSW-10 subwoofers may limit the amplifer output prematurely when they are driven to high volume levels. This may result in the subwoofer "popping", and then a lower than normal output. A normal output will not return until the volume is decreased, or the subwoofer is switched Off, then On again.

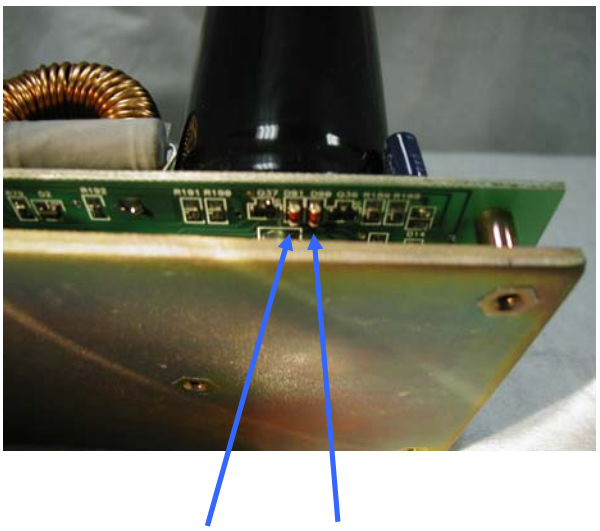
In the event you receive a CSW-10 subwoofer with a complaint of "Premature Limiting When Driven At High Levels", follow the procedure below to correct this condition:

Synopsis: Add two diodes to the limiter section on the MAIN PCB, D90 and D91.

1) Remove the amplifier assembly from the cabinet by removing the (12) screws located around the perimeter of the plate (Red circles in image); it will still be connected by the speaker wires.
2) Remove the (2) screws used to secure the plastic cover to the amp panel (Blue arrows in image), separate the panel from the plastic cover, and unplug the speaker wires from MAIN PCB (Red & Blk).
3) Remove the MAIN PCB from the faceplate:
   a. Remove the (5) screws used to secure the amp module to the front panel (Pointing fingers in image).
   b. Unplug P1 Signal Harness (Harness with white wires)
   c. Remove ground wire (Black wire with ring terminal)
   d. Unplug Power Transformer wires (Red-White-Red)
4) Locate D90 & D91 trace locations close to the main power capacitors (refer to the image)
5) Solder two RLS4148 SMD Diodes in their designated areas, D90 and D91, Infinity part # 054-414803-100. IMPORTANT: POLARITY - Diodes should be soldered with their cathode facing into the amplifier assembly, anodes facing the PCB edge of the amplifier. You should be able to solder the diodes in place without PCB disassembly from the heatsink plate with care, and a long, pointed soldering tip.
6) Re-Attach the MAIN PCB to the faceplate, following in reverse order items #3a-d. Assure that the power transformer wires are connected with White in the center and Red wires to the outer sides of the rectifier.



Location of D90 & D91



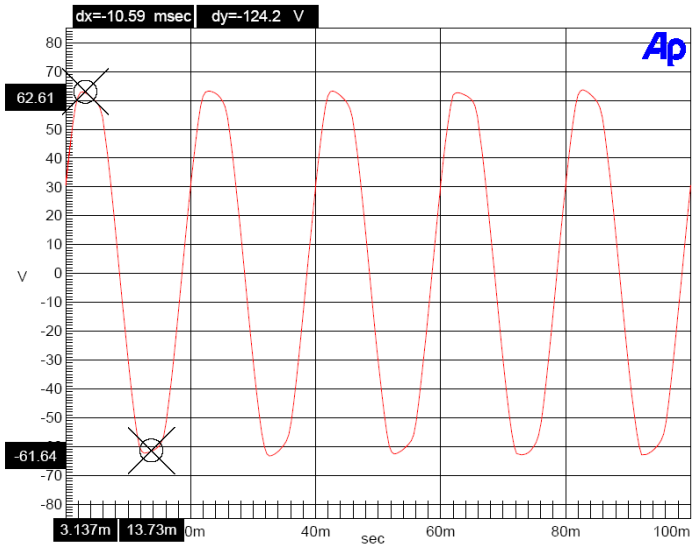
(Installed)

TESTING

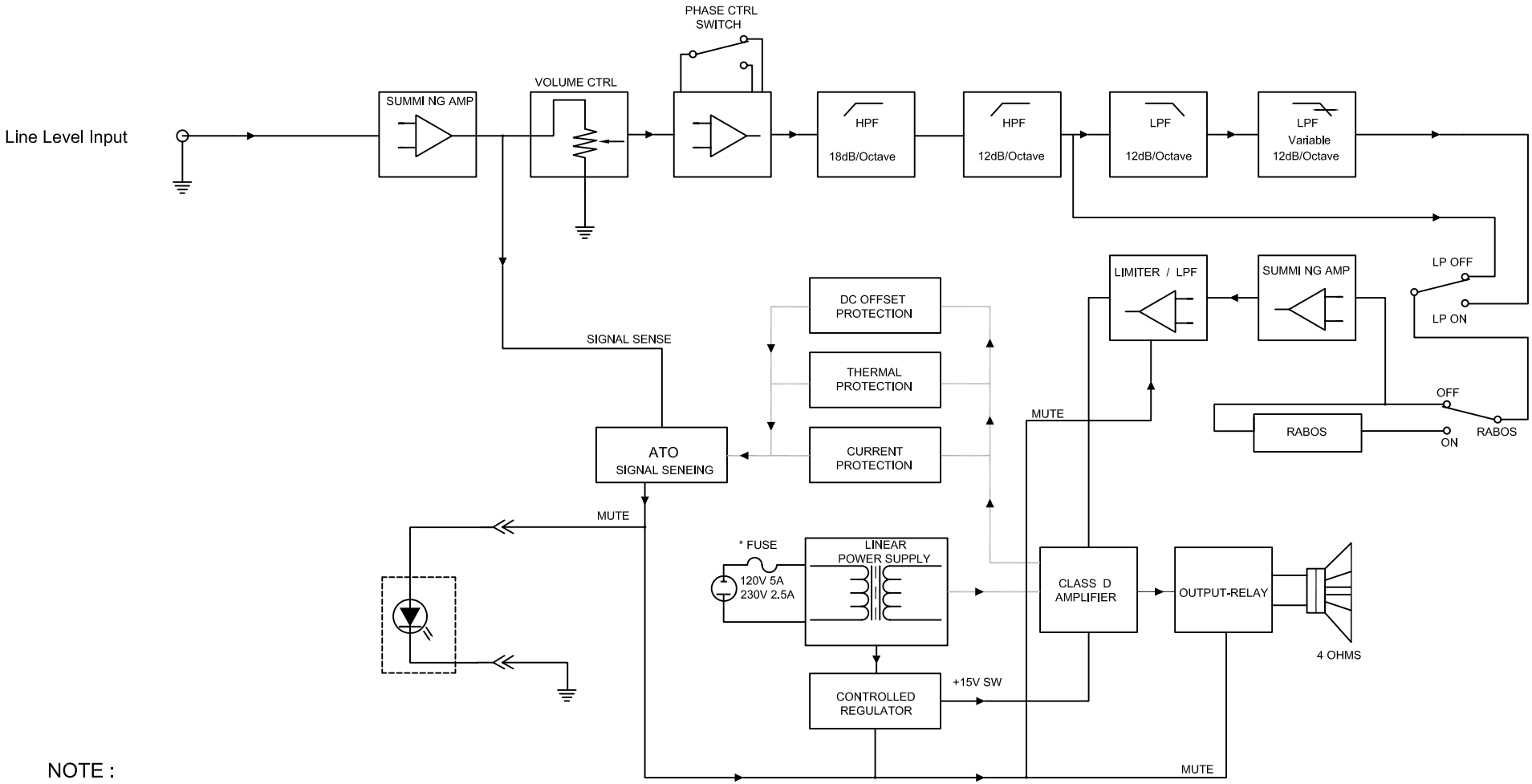
7) Set the amplifier controls as follows:
   a. Gain control to full CCW (MIN)
   b. Crossover control to full CW (150)
   c. Phase switch to 0
   d. LFE/Normal switch to Normal
   e. RABOS Switch to OFF
   f. AC Power switch to OFF
8) Connect the amplifier to an 8 ohm resistive load (250W minimum)
9) Connect a Sine wave signal: 50Hz, 0.250VRMS signal to the amplifier Left **or** Right input.
10) Connect an oscilliscope to both terminals of the load resistor. IMPORTANT: Make sure that the scope is floating or isolated; (this amplifier is configured in BRIDGE mode and a Ground connection to any of its terminals could cause a malfunction).
11) Connect the unit to a 120V source (or 230V for 230 models); Turn ON AC Main power switch.
12) Increase the gain control to MAX for few seconds and verify the signal on the scope; clipping must be symmetrical and should extend to the 60V area (positive & negative peaks). Refer to the sample graph.
13) Reduce the Gain to minimum; turn AC mains switch to OFF and disconnect the unit from the AC source.
14) Re-install the amplifier assembly into the cabinet.

FINAL TEST

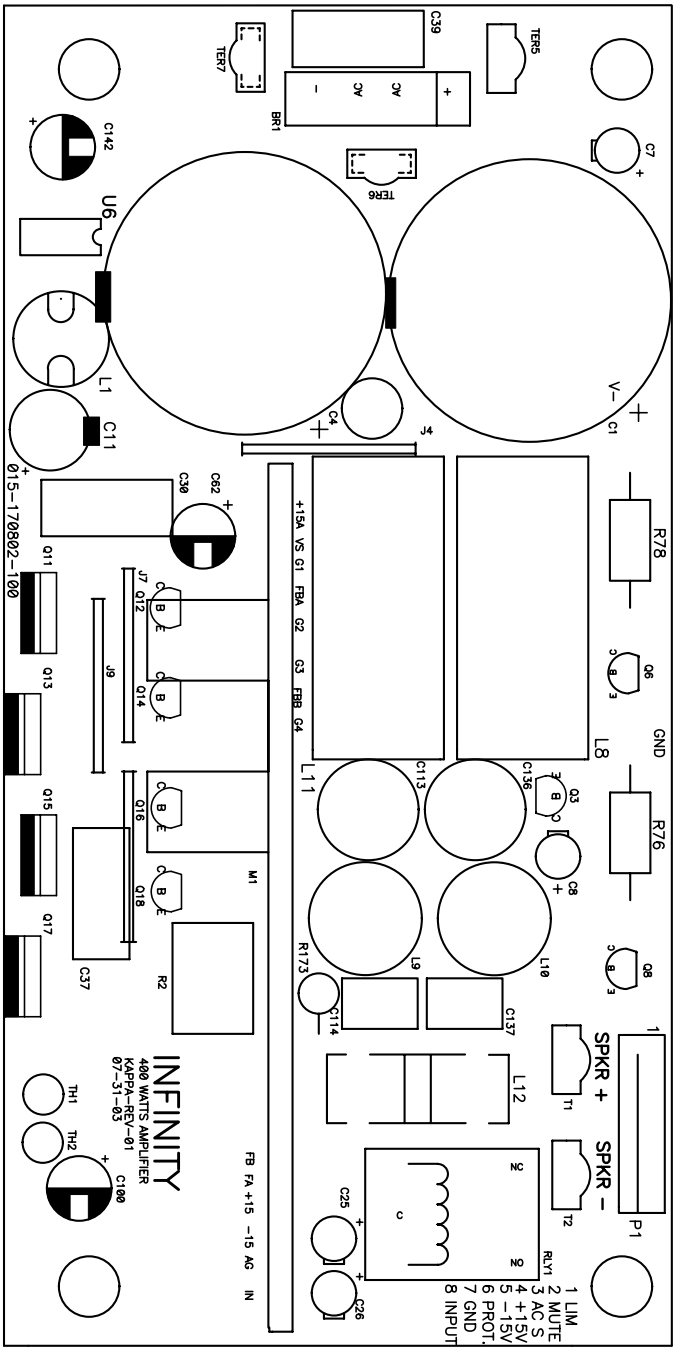
15) Connect the unit to a 120V source (or 230V for 230 models); Turn ON AC Main power switch.
16) Connect a Sine wave signal: 50Hz, 0.100VRMS signal to the amplifier Left or Right input.
17) Increase gain control to MAX and make sure that unit produces sound, make sure that there is no evidence of air leaks or any other objectionable sound by moving the gain control up and down.
18) Turn OFF AC Main power switch, disconnect the unit from the AC source and reset the Gain control to minimum.

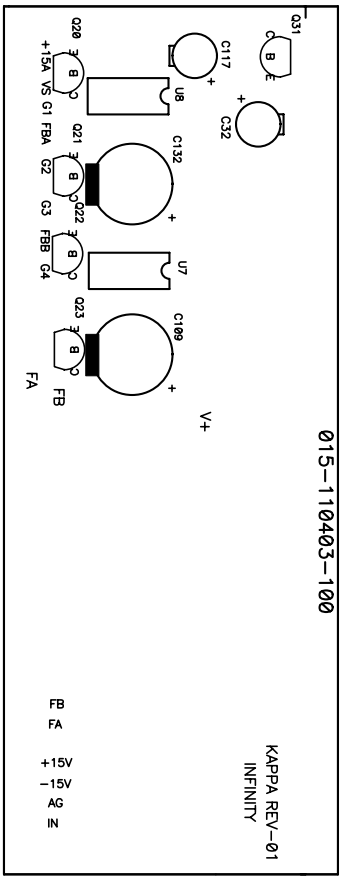


Model	IDENTIFICATION	STATUS	ACTION
CSW-10	Missing <u>All</u> Indicators Described Below	Premature Limiting When Driven At High Levels	Add two RLS4148 SMD Diodes in location D90 & D91
CSW-10	**Modified CSW-10 subwoofers will have *one or more* of the following indicators:** 1) Blue mark on the serial number (amp faceplate) 2) Silver/light marker on rear of plastic amp cover 3) "QC" stamp on outer carton near bar code label. 4) Serial Number starts with prefix: HA0234, HA0235, or HA0236. 5) Serial Numbers: HA0217-05000 and above HA0226-05000 and above	Modified by Factory	None Required



NOTE :
120 VAC T5A-250V
230 VAC T2.5A-250V


INFINITY
400 WATTS AMPLIFIER
KAPPA-REV-01
07-31-03
SPKR +
SPKR -
1 LIM
2 MUTE
3 AC S
4 +15V
5 -15V
6 PROT.
7 GND
8 INPUT
015-170802-100
+15A VS G1 FBA G2 G3 FBB G4
FB FA +15 -15 AG IN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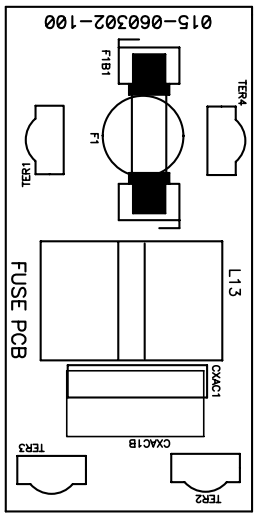
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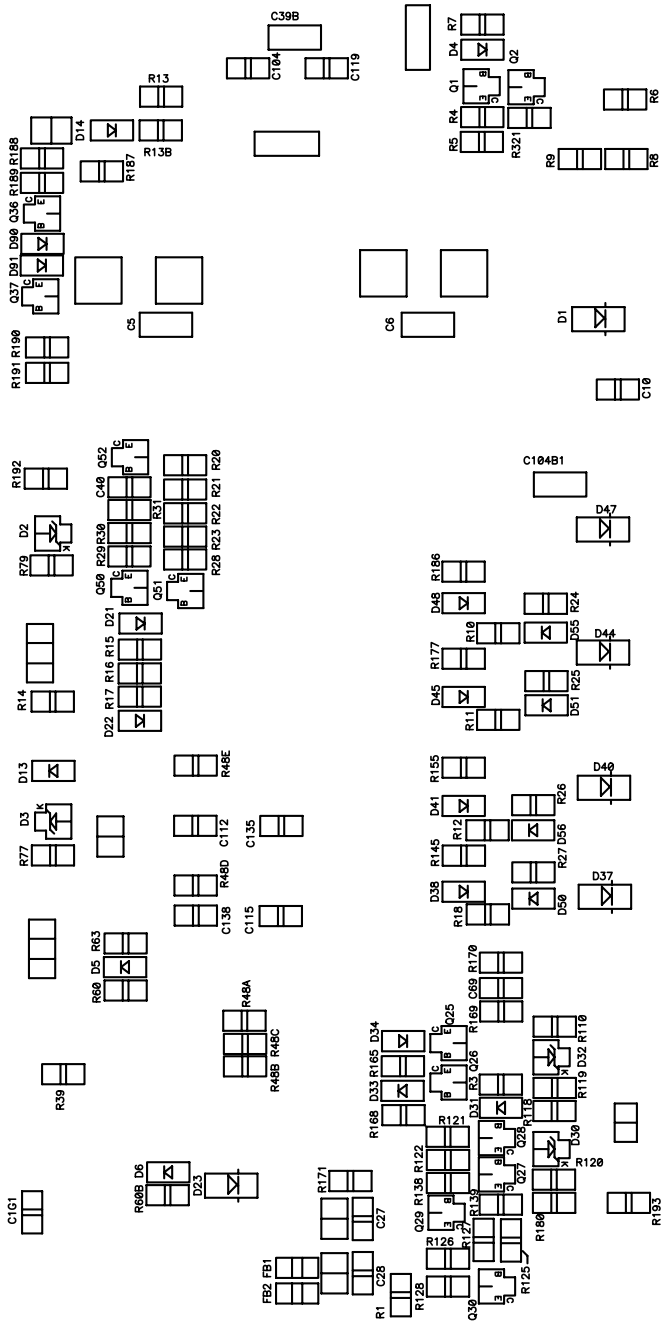
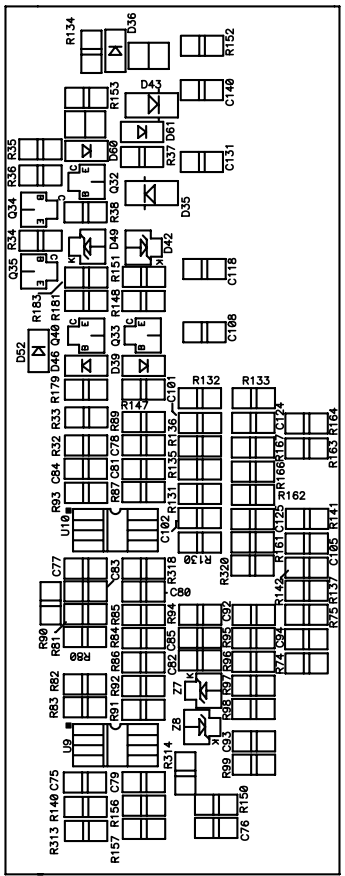
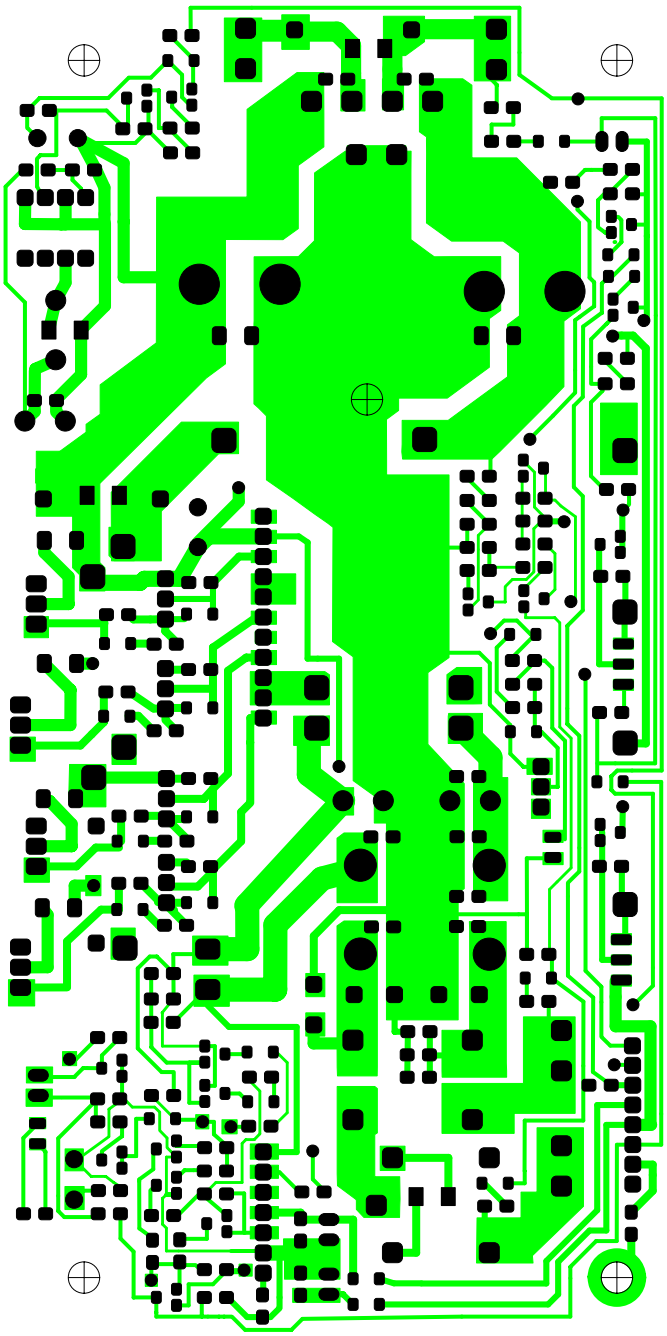
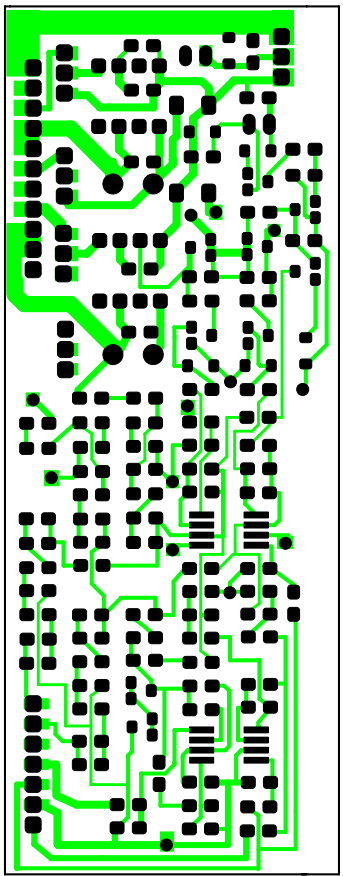
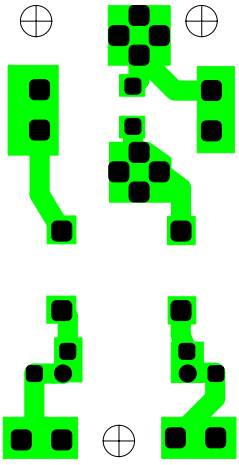
FUSE PCB

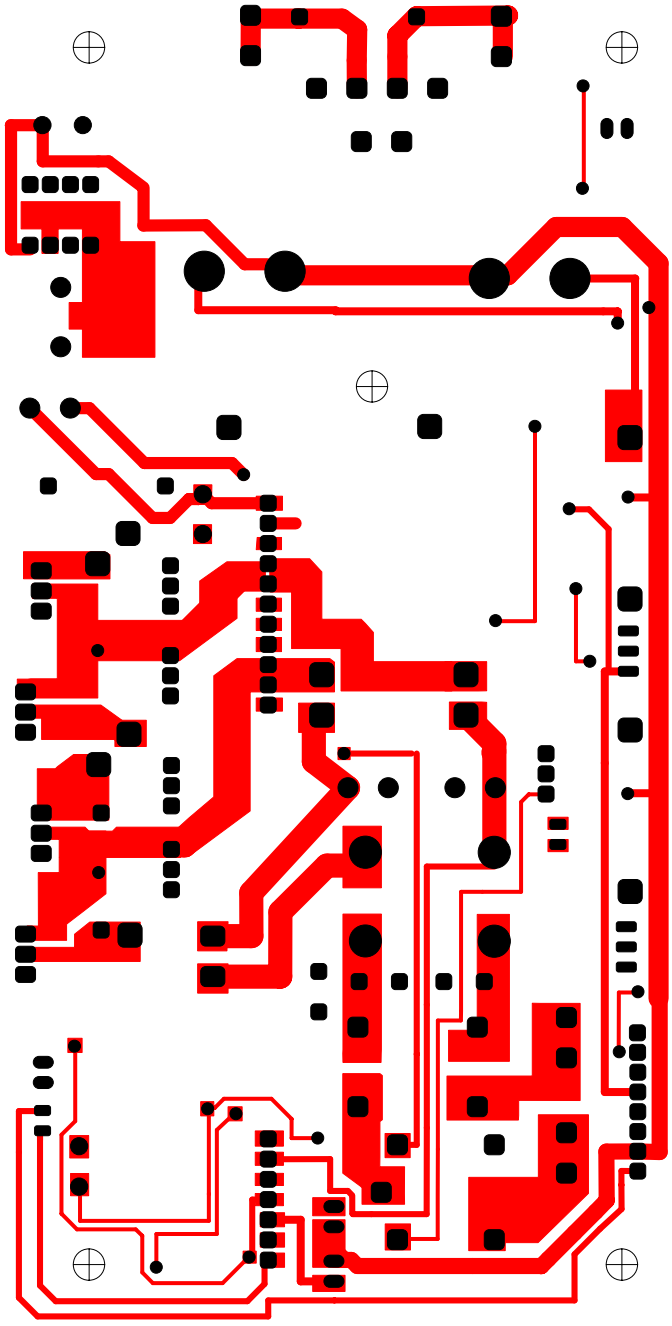


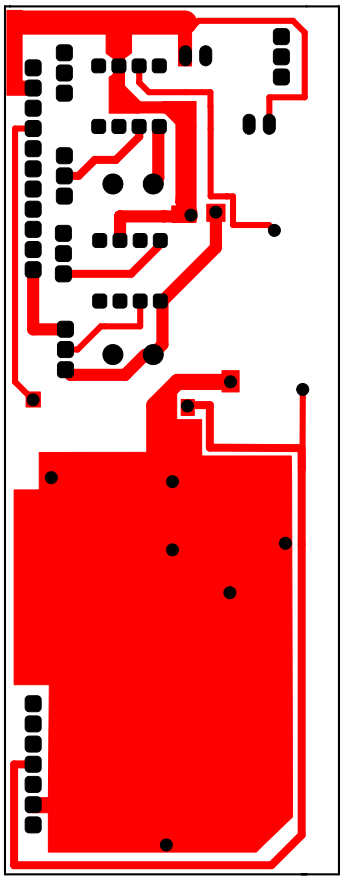


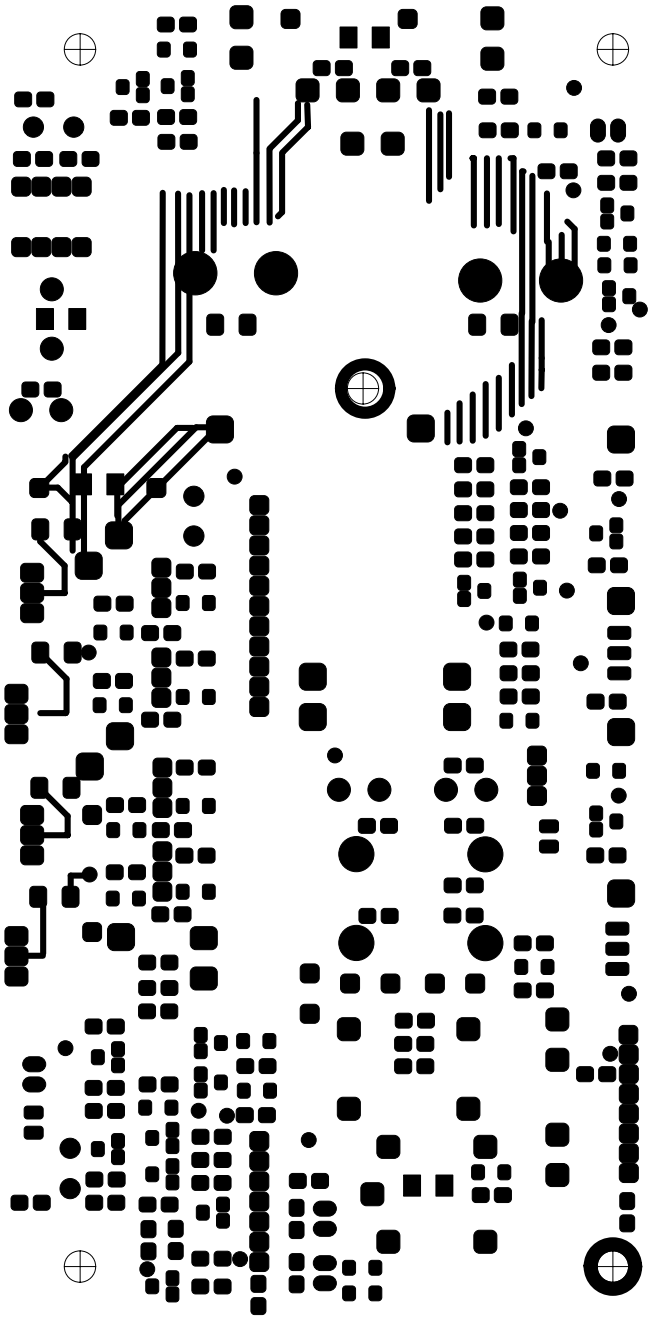


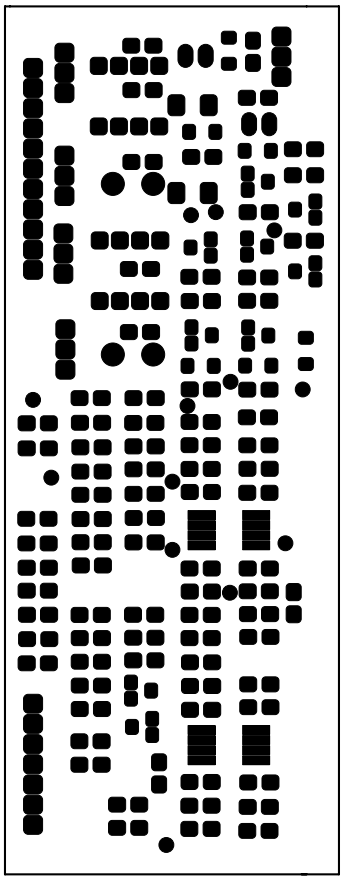


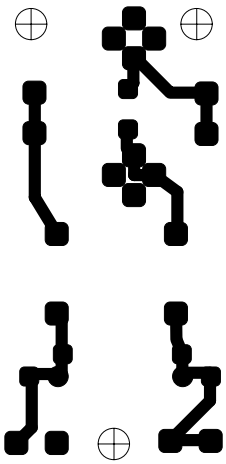


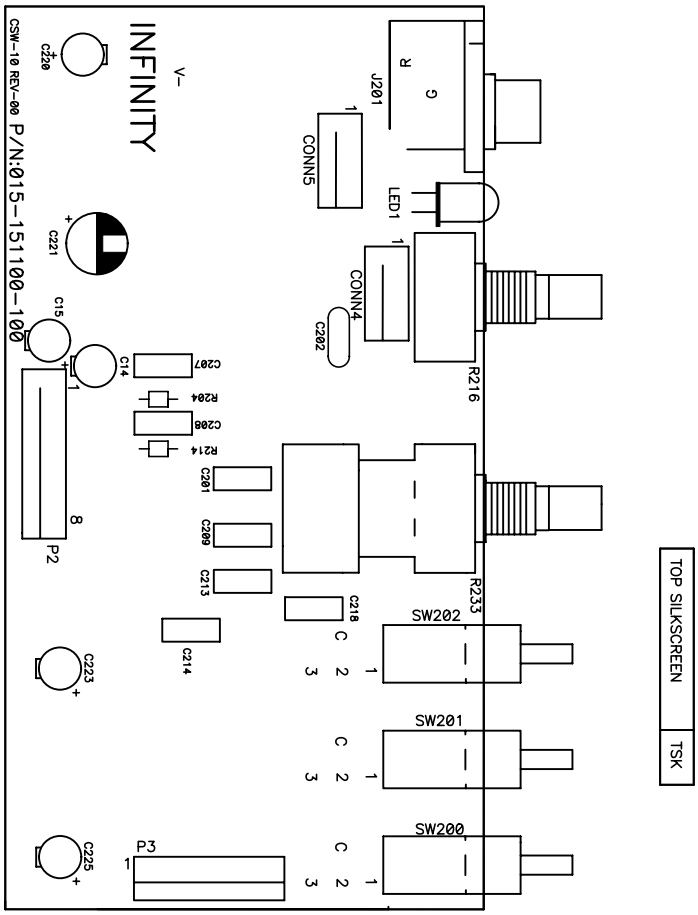




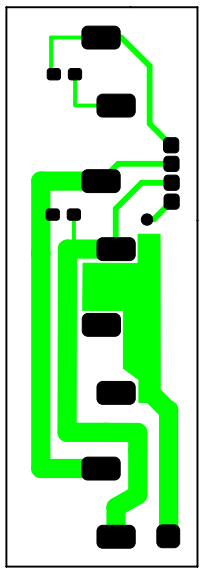


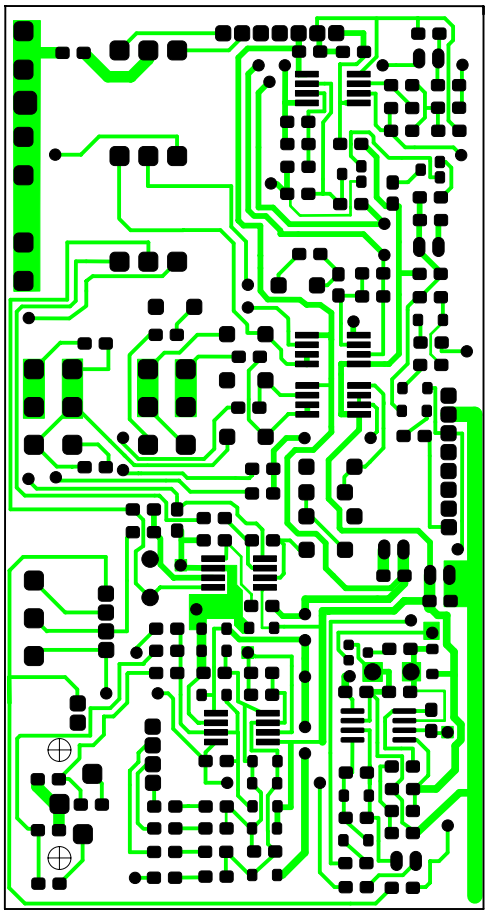




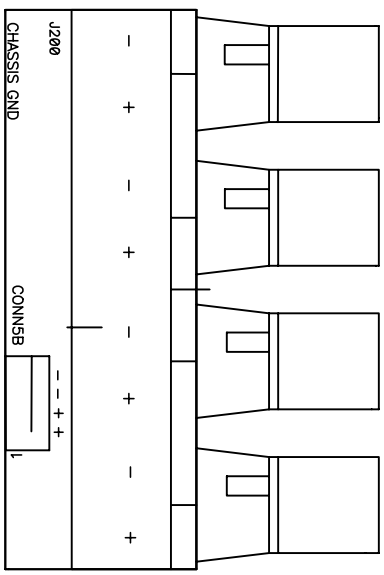


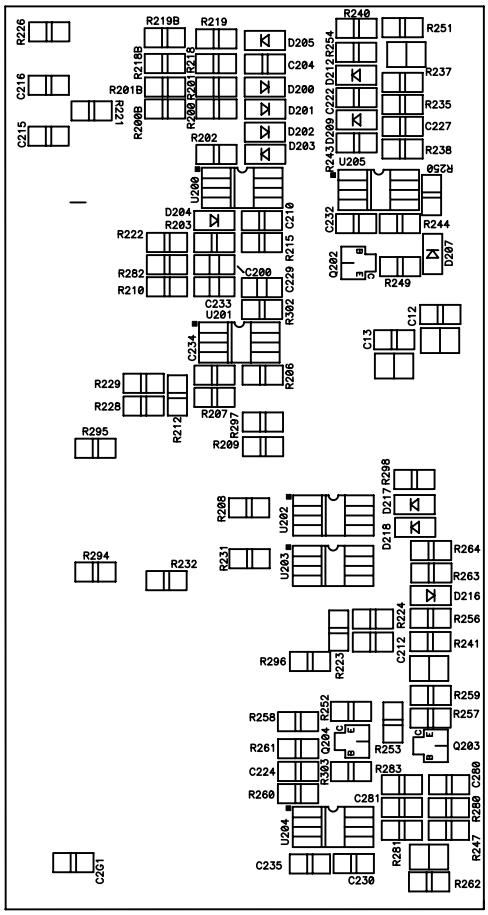
TOP SILKSCREEN | TSK



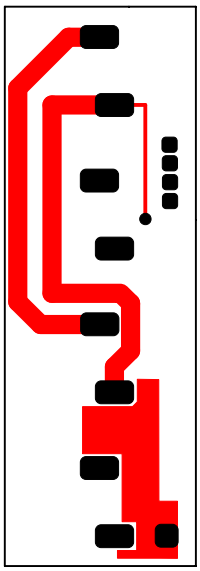


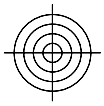
BOTTOM LAYER | BOT

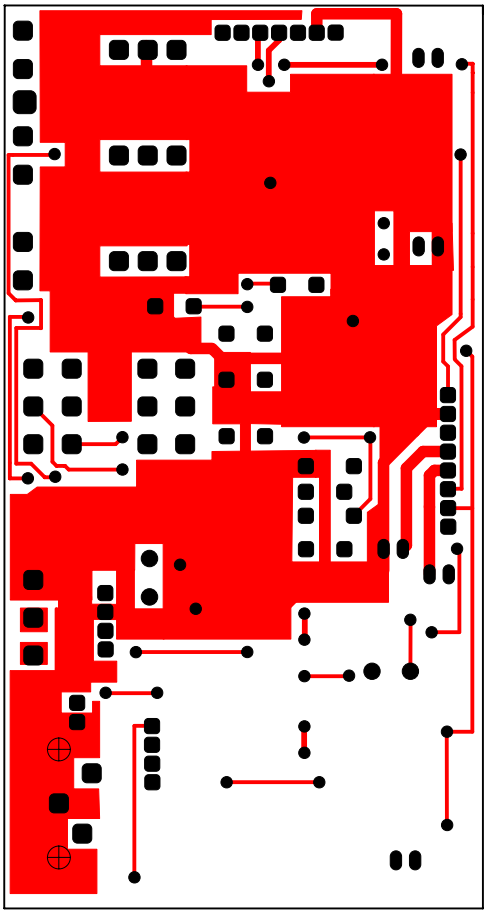




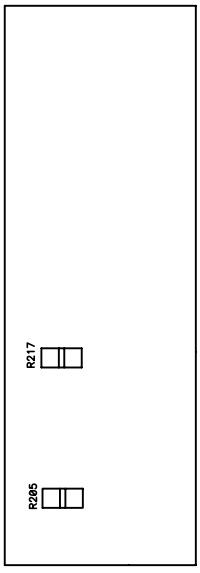
BOTTOM SILKSCREEN
BSK



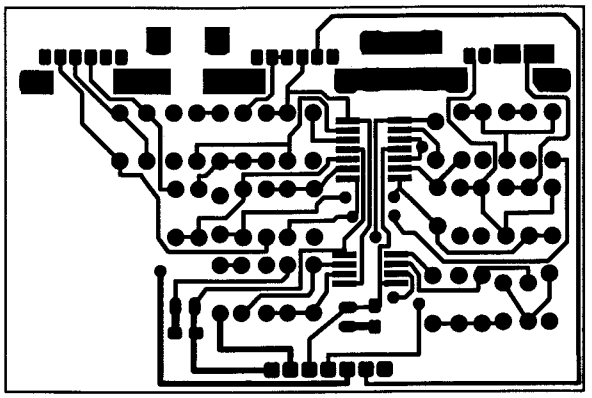




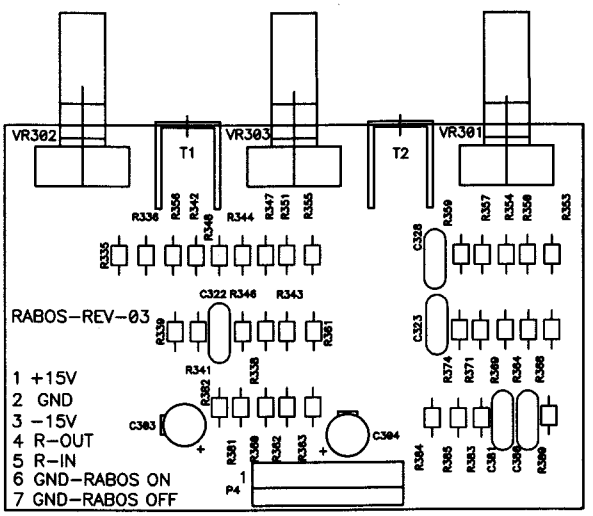
TOP
TOP LAYER

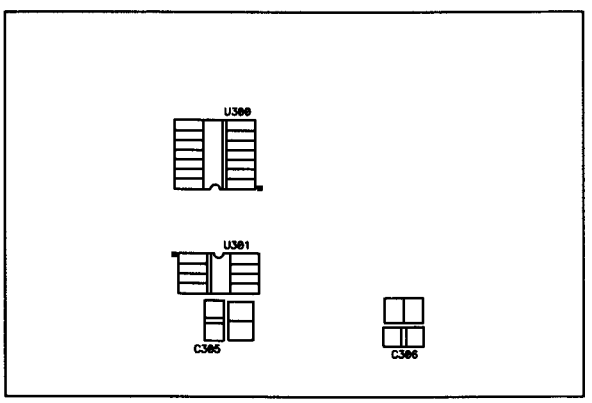


BOTTOM LAYER	BOT



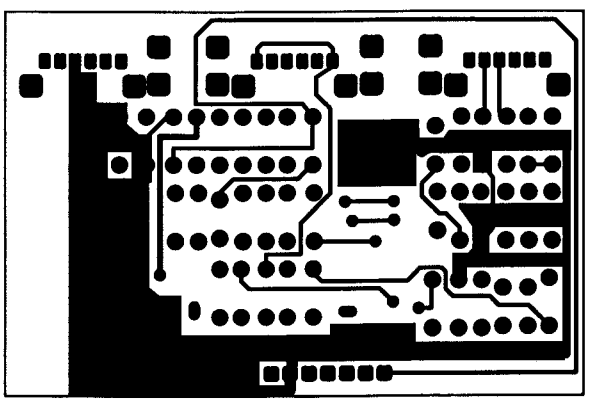
TOP SILKSCREEN	TSK





BOTTOM SILKSCREEN	BSK

TOP LAYER	TOP



CSW-10 120/230v Electrical parts list				
Part number	Qty	Description		Reference Designator
MAIN PCB				
Resistors				
021-100401-020	1	MOF Resistor	1K 1W J FK TYPE	R173
021-560305-020	1	MOF Resistor	560R 5WS J 8x25 KINK	R76
022-005105-020	1	Resistor	PN:SQM 0R05 5W J 25x13	R2
022-470307-020	1	Winding resistor KNP	470R 7W J (KNP-700S)	R78
024-000098-120	1	SMD Resistor	0R 1/8W J 0805	R8
024-100498-120	1	SMD Resistor	1K 1/8W J 0805	R110
024-100598-120	15	SMD Resistor	10K 1/8W J 0805	R5,7,16,118,121,122,125,1,
024-100698-120	2	SMD Resistor	100K 1/8W J 0805	R15,120
024-110598-120	4	SMD Resistor	11K 1/8W J 0805	R187,188,190,191
024-130498-120	2	SMDResistor	1K3 1/W J 0805	R189,192
024-150598-120	2	SMDResistor	15K 1/8W J 0805	R20,21
024-160598-100	2	SMDResistor	16K 1/8W F 0805	R13,13B
024-220298-120	2	SMDResistor	22R 1/8W J 0805	R28,29
024-220498-120	1	SMD Resistor	2K2 1/4W J 1206	R119
024-220498-121	2	SMD Resistor	2K2 1/8W J 0805	R17,31
024-220598-120	2	SMD Resistor	22K 1/8W J 0805	R127,37
024-330498-120	4	SMD Resistor	3K3 1/8W J 0805	R77,79,22,169
024-330598-120	5	SMD Resistor	33K 1/8W J 0805	R4,6,14,60,60B
024-412498-100	1	SMD Resistor	4K12 1/8W F 0805	R63
024-470298-120	4	SMD Resistor	47R 1/8W J 0805	R24-27
024-470398-120	4	SMD Resistor	470R 1/8W J 0805	R145,155,177,186
024-470598-120	2	SMD Resistor	47K 1/8W J 0805	R3,171
024-510498-120	5	SMD Resistor	5K1 1/8W J 0805	R48A,48B,48C,48D,48E
024-560498-120	1	SMD Resistor	5K6 1/8W J 0805	R30
024-680498-120	1	SMD Resistor	6K8 1/8W J 0805	R23
Capacitors				
031-100144-106F	2	SMD Cap.	0u01/50V K 0805 X7R	C27,28
031-100184-100F	2	SMD Cap.	0u01/250V K 0805 X7R	C104,119
031-100344-100F	6	SMD Cap.	0u1/50V K 0805 X7R	C10,69,112,115,135,138
031-100384-100F	2	SMD Cap.	0u1/250V K 1206 X7R	C5,6
031-220344-300F	1	SMD Cap.	220pF/50V K 0805 NPO	C40
031-470144-101F	1	SMD Cap.	0u0047/50V K 0805 X7R	C1G1
034-100614-300	1	Electrolytic Cap.	100uF/16V M (R)0611 P:2.5	C8
034-100625-300	1	Electrolytic Cap.	100uF/25V M (R)6.3x11 P:5	C62
034-100695-300	1	Electrolytic Cap.	100uF/63V M (R)1012 P:5	C142
034-220525-300	2	Electrolytic Cap.	22uF/25V M (R)5x11 P:2.5 TAPIN	C25,26
034-330625-300	2	Electrolytic Cap.	330uF/25V M (R)1013 P:5	C11,100
034-470415-300	1	Electrolytic Cap.	4u7/50V M (R)0511 P:2.0	C7
032-100484-200	3	ENDMylar Capacitor	1uF/250V K P:15	C37,39,30
033-330444-270	2	NPE Cap.	3u3/50V K10 (R)8x13 SBE	C114,137
033-680464-270	2	NPE Cap.	6u8/100V K10 (R)1020 GNE	C113,136
034-150895-200	2	Electrolytic cap. 85□	15000uF/63V M (R)3555 P:10mm	C1,4
Semiconductors				
054-000100-100	6	SMD DIODE	PN:ES1D 200V 1A	D1,23,37,40,44,47
054-001002-100	1	SMD ZENER DIODE	PN:BZX84C10 10V SOT-23	D32
054-001501-100	2	SMD ZENER DIODE	PN:BZX84C15 15V SOT-23	D2,3
054-033904-100	6	SMD Transistor	PN:MMBT3904LT1 SOT23 (ON	Q25,28,29,37,50,51
054-033906-100	5	SMD Transistor	PN:MMBT3906LT1 SOT23 (ON	Q26,27,30,36,52

Part number	Qty	Description		Reference Designator
MAIN PCB				
054-050601-100	1	SMD ZENER DIODE	PN:BZX84C5V6 5.6V SOT-23 TAPIN	D30
054-414803-100	16	SMD DIODE	PN:LL4148 (Wishay)	D4-5,13,14,21,22,31,33,38,
054-540100-100	1	SMD Transistor (PNP)	PN:MMBT5401 LT1 SOT-23	Q1
054-555100-100	1	SMD Transistor (NPN)	PN:MMBT5551 LT1 (ON)	Q2
051-000600-100	1	Transistor NPN	PN:MPSW06RLRA TO-92 (ON)	Q6
051-005600-100	1	Transistor PNP	PN:MPSW56RLRA TO-92 (ON)	Q8
051-290700-100	4	Transistor PNP (ON)	PN:MPS2907A RLRA TO-92	Q12,14,16,18
051-540101-000	1	Transistor PNP(FAIRCHILD	PN:2N5401 TO-92	Q3
051-002301-000	4	MOSFET N CHANNEL	PN:FB23N20D	Q11,13,15,17
052-400080-000	1	Bridge Regulator	PN:RS804 400V,8A	BR1
053-257400-100	1	IC;DIP,Regulator	PN:LM2574 HVN-15V 8PIN (NS)	U6
Miscellaneous				
044-100100-000	2	SMD FERRITE BEAD	PN:321611 600R/100MHz 1206	FB1,FB2
043-300101-000	2	INDUCTOR	PN:YT-10033 30uH	L9,10
043-560200-000	1	INDUCTOR	56uH YT-10779	L12
043-700100-000	1	INDUCTOR	70uHx2 YT-10024	L8
043-820300-000	1	INDUCTOR	820uH YT-10034	L1
025-010300-000	1	Thermister	TSE-103 K L:50mm	TH1
025-210100-000	1	Thermister (PTC)	PN:PTMS2101RP516B	TH2
072-040008-110	1	8P Terminal housing	JS-1001-08	P1
072-040039-000	1	Terminal (PCB TYPE)	PC205 (t=0.8m/m) T205MA	T1
072-040064-000	2	Terminal (PCB TYPE)	PC250(t=0.8),T250MA	T2,TER6
072-040096-000	2	Terminal T187MA(PCB)	(t=0.8mm) PC187(0.8)	TER5,TER7
073-111003-000	1	Shorting Strap	54.9x13.6x1mm	J7
073-111004-000	2	Shorting Strap	29.5x12.4x0.8m/m	J4,9
074-300018-000	1	RELAY	PN:943-1C-48D	RLY1
DRIVER PCB				
024-000098-120	4	SMD Resistor	0R 1/8W J 0805	R313,314,318,320,
024-100298-120	4	SMD Resistor	10R 1/8W J 0805	R89,90,140,150
024-100498-120	10	SMD Resistor	1K 1/8W J 0805	R81,85,96,97,131,137,142,
024-100598-120	12	SMD Resistor	10K 1/8W J 0805	R75,82,83,92,98,132,133,
024-100798-120	2	SMD Resistor	1M 1/8W J 0805	R32,33
024-110598-120	2	SMD Resistor	11K 1/8W J 0805	R74,99
024-200598-120	2	SMD Resistor	20K 1/8W J 0805	R95,141
024-220398-120	2	SMD Resistor	220R 1/8W J 0805	R136,167
024-220498-121	1	SMD Resistor	2K2 1/8W J 0805	R134
024-220598-120	1	SMD Resistor	22K 1/8W J 0805	R37
024-220798-120	2	SMD Resistor	2M2 1/8W J 0805	R87,93
024-270498-120	3	SMD Resistor	2K7 1/8W J 0805	R80,84,157
024-390498-120	2	SMD Resistor	3K9 1/8W J 0805	R130,161
024-390598-120	2	SMD Resistor	39K 1/8W J 0805	R86,94
024-470398-120	1	SMD Resistor	470R 1/8W J 0805	R91
024-470498-120	6	SMD Resistor	4K7 1/8W J 0805	R151-153,183,34,36
024-470598-120	1	SMD Resistor	47K 1/8W J 0805	R35
024-560598-120	1	SMD Resistor	56K 1/8W J 0805	R38
024-680498-120	2	SMD Resistor	6K8 1/8W J 0805	R135,166
Capacitors				
034-100625-303	1	Electrolytic Cap.	100uF/25V M (R) P:2.5	C117
034-100715-202	2	Electrolytic Cap. 85□	1000uF/16V M (R)1017 P:5	C109,132

Part number	Qty	Description		Reference Designator
DRIVER PCB				
034-330615-301	1	Electrolytic Cap.	330uF/16V M (R)0812 P:3.5	C32
031-100144-106F	4	SMD Cap.	0u01/50V K 0805 X7R	C108,118,131,140
031-100343-100F	2	SMD Cap.	100pF/50V J 0805 NPO	C81,84
031-100344-100F	6	SMD Cap.	0u1/50V K 0805 X7R	C75-78,82,85
031-180344-100F	2	SMD Cap.	0u18/50V K 0805 X7R	C80,83
031-470244-102F	4	SMD Cap.	0u047/50V K 0805 X7R	C93,94,101,124
031-560243-100F	4	SMD Cap.	56pF/50V J 0805 NPO	C92,102,105,125
031-560343-101F	1	SMD Cap.	560pF/50V J 1206 X7R	C79
Semiconductors				
051-000600-100	1	Transistor NPN	PN:MPSW06RLRA TO-92 (ON)	Q31
051-222200-100	2	Trasistor NPN (ON SEM)	PN:MPS2222ARLRA TO-92	Q20,22
051-555100-000	2	Transistor NPN	PN:2N5551 TO-92	Q21,23
053-211100-000	2	IC;DIP,DRIVER	PN:IR2111 8PIN (IR)	U7,8
054-000100-100	2	SMD DIODE	PN:ES1D 200V 1A	D35,43
054-001002-100	2	SMD ZENER DIODE	PN:BZX84C10 10V SOT-23	D42,49
054-005501-100	1	SMD ZENER DIODE	PN:BZV55C3V6 (PHILIPS)	D60
054-007200-100L	2	SMD IC; DUAL OP-AMP	PN:M072M-TE1 DMP8 (JRC)	U9,10
054-033906-100	2	SMD PNP Transistor	PN:MMBT3906LT1 SOT23 (ON	Q34,35
054-050601-100	2	SMD ZENER DIODE	PN:BZX84C5V6 5.6V SOT-23 TAPIN	Z7,8
054-414803-100	5	SMD DIODE	PN:LL4148 (Wishay)	D36,39,46,52,61
054-540100-100	2	SMD Transistor (PNP)	PN:MMBT5401 LT1 SOT-23	Q33,40
054-555100-100	1	SMD Transistor (NPN)	PN:MMBT5551 LT1 (ON)	Q32
Miscellaneous				
072-040229-000	1	HEADER Right Angle	PN:211-107-000-400 7PIN	PIN2
072-040230-000	1	HEADER Right Angle	PN:211-111-000-400 11PIN	PIN1
PREAMP/RABOS PCB				
021-100398-100	1	MF Resistor	100R 1/8W F	R339
021-100498-100	2	MF Resistor	1K 1/8W F	R363,381
021-100598-100	9	MF Resistor	10K 1/8W F	R338,342,343,346,348,353,
021-100798-100	1	MF Resistor	1M 1/8W F	R356
021-100898-100	1	MF Resistor	10M 1/8W F	R362
021-110698-100	1	MF Resistor	110K 1/8W F	R347
021-120598-100	2	MF Resistor	12K 1/8W F	R354,369
021-140598-100	1	MF Resistor	14K 1/8W F	R380
021-150198-100	1	MF Resistor	1K5 1/8W F	R341
021-162398-100	1	MF Resistor	162R 1/8W F	R384
021-267498-100	1	MF Resistor	2K67 1/8W F	R336
021-330498-100	1	MF Resistor	3K3 1/8W F	R204
021-330598-100	1	MF Resistor	33K 1/8W F	R383
021-340398-100	2	MF Resistor	340R 1/8W F	R357,371
021-357498-100	1	MF Resistor	3K57 1/8W F	R335
021-470598-100	1	MF Resistor	47K 1/8W F	R214
021-549398-100	1	MF Resistor	549R 1/8W F	R344
021-590498-100	1	MF Resistor	5K9 1/8W F	R382
021-619498-100	2	MF Resistor	6K19 1/8W F	R359,374
021-680398-100	1	MF Resistor	680R 1/8W F	R360
021-787398-100	2	MF Resistor	787R 1/8W F	R350,364
021-909398-100	1	MF Resistor	909R 1/8W F	R385
021-931498-100	1	MF Resistor	9K31 1/8W F	R351

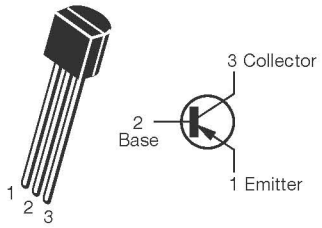
Part number	Qty	Description		Reference Designator
PREAMP/RABOS PCB				
024-000097-120	3	SMD Resistor	0R 1/4W J 1206	R302,303,297
024-100498-121	3	SMD Resistor	1K 1/4W J 1206	R238,264,298
024-100598-121	14	SMD Resistor	10K 1/4W J 1206	R202,206,207,212,222,
024-150498-121	1	SMD Resistor	1K5 1/4W J 1206	R251
024-150598-121	1	SMD Resistor	15K 1/4W J 1206	R223
024-200598-121	1	SMD Resistor	20K 1/4W J 1206	R256
024-220298-121	1	SMD Resistor	22R 1/4W J 1206	R249
024-226598-100	4	SMD Resistor	22K6 1/4W F 1206	R208,209,231,232
024-237597-100	1	SMD Resistor	23K7 1/4W F 1206	R281
024-270498-121	1	SMD Resitor	2K7 1/4W J 1206	R237
024-300398-121	1	SMD Resistor	300R 1/4W J 1206	R258
024-300598-121	1	SMD Resistor	30K 1/4W J 1206	R260
024-330498-101	2	SMD Resistor	3K3 1/4W F 1206	R203,215
024-330498-121	1	SMD Resistor	3K3 1/4W J 1206	R240
024-470598-120	2	SMD Resistor	47K 1/8W J 0805	R280,283
024-470698-121	1	SMD Resistor	470K 1/4W J 1206	R259
024-470798-120	1	SMD Resistor	4M7 1/8W J 0805	R244
024-470798-121	1	SMD Resistor	4M7 1/4W J 1206	R243
024-510398-121	1	SMD Resitor	510R 1/4W J 1206	R261
024-560598-121	1	SMD Resistor	56K 1/4W J 1206	R224
024-620398-121	2	SMD Resistor	620R 1/4W J 1206	R221,226
024-680498-121	1	SMD Resistor	6K8 1/4W J 1206	R247
024-680598-121	1	SMD Resistor	68K 1/4W J 1206	R250
024-820598-121	1	SMD Resistor	82K 1/4W J 1206	R263
031-100244-101F	4	SMD Resistor	0u01/50V K 1206 X7R	C12,13,224,280
031-100344-102F	7	SMD Resistor	0u1/50V K 1206 X7R	C227,229,230,232-235
031-100344-104F	1	SMD Resistor	100pF/50V K NPO 1206	C222
031-100345-300F	2	SMD Resistor	0u1/50V M 1206 X7R	C305,306
031-220344-103F	4	SMD Resistor	220pF/50V K NPO 1206	C200,210,215,216
031-330445-100F	1	SMD Resistor	3300pF/50V M 1206 X7R	C281
031-470444-101F	1	SMD Resistor	4700pF/50V K X7R 1206	C2G1
031-680444-100F	1	SMD Resistor	6800pF/50V K X7R 1206	C212
026-100595-001	2	VR 10KAx2 (NOBLE)	XV012311YGPJ25F15A10K-21PC/1	VR302,303
026-100595-002	1	VR 10KCx2 (NOBLE)	XV012311YGPJ25F15C10K-21PC/1	VR301
026-500595-254	1	VR 50KA	P/N:RK163111R405-EJ	R216
026-500595-267	1	VR 50KBx4	PN:RD1631411001D-50KBx4 (EJ)	R233
Capacitors				
034-100515-300G	1	Electrolytic Cap.	10uF/16V M (R)0511 P:2	C220
034-100615-301	1	Electrolytic Cap.	100uF/16V M (R)0611 P:5	C221
034-220516-301	2	Electrolytic Cap.	22uF/16V M (R)0511 P:2	C223,225
034-220525-300	4	Electrolytic Cap.	22uF/25V M (R)5x11 P:2.5 TAPIN	C303,304,14,15
035-100363-300	5	PE Cap.	0u1/100V J P:5m/m	C322,323,328,380,381
035-220243-100	1	PECap. FE-M	0u022/63V J P:5m/m	C202
035-330293-300	2	PE Cap.	0u033/63V J P:5	C209,218
035-470353-301	2	PE Cap FE-M	0u47/63V J P:5m/m	C207,208
035-680253-300	2	PE Cap FE-M	0u068/63V J P:5m/m	C201,213
Semiconductors				
054-007200-100L	7	SMD IC; DUAL OP-AMP	PN:M072M-TE1 DMP8 (JRC)	U200-205,301
054-007400-100	1	SMD IC; QUAD OP-AMP	PN:TL074CDR (TI)	U300
054-011400-100	1	SMD NPN Transistor	PN:DTC114TKA SMT3 (ROHM	Q202
054-033904-100	2	SMD NPN Transistor	PN:MMBT3904LT1 SOT23 (ON	Q203,204

Part number	Qty	Description		Reference Designator
PREAMP/RABOS PCB				
054-414803-100	8	SMD DIODE	PN:LL4148 (Wishay)	D201,204,207,209,212,216,
050-505200-001	1	LED	PN:LT-2402-21	LED1
Miscellaneous				
072-010058-000	1	RCA JACK 2P	PN:0502000W1G (Red,White)	J201
072-040007-000	2	7P Terminal hous SWA101	JS-1001-07	P3,4
072-040008-110	1	8P Terminal housing	JS-1001-08	P2
073-010021-000	3	Screw fixing house	PN:PCB-2(M3) 4PIN	T1,2,3
074-030002-000	3	TOGGLE SW	PN:L101-T2B4QE	SW200-202
FUSE PCB				
043-324300-000	1	INDUCTOR	324uH YT-10778	L13
072-040064-000	1	Terminal (PCB TYPE)	PC250(t=0.8),T250MA	TER2
072-040096-000	3	Terninal T187MA(PCB)	(t=0.8mm) PC187(0.8)	TER1,3,4
039-220180-100	1	X2 Safety Cap. 0u22/250V	18x16.5x8.5mm PN:XG275M224VHS2	CXAC1
073-050001-000	2	FUSE CLIP	P/N:CFFH1206	F1,B1
091-000200-000	1	FUSE (230V)	T2.5A/250V φ5x20m/m	F1
093-205205-300	1	FUSE (120V)	T5A/250V φ5x20m/m, 120V version	F1
MISCELLANEOUS				
008-060302-072	4	GASKET (UL) PORON	PN:MO-48C 25x18 t=5mm PSA	X'FORMER
008-061215-000	1	GASKET C4305	12x15 t=5mm CR PSA	Thermister
008-062401-032	4	GASKET	235.3x11mm t=2mm PSA	COVERx2,PANELx2
008-062501-022	4	GASKET	253.3x11mm t=2mm PSA	COVERx2,PANELx2
042-010139-000	1	Transformer	PN:YT-13438 CSW-10 120V/60Hz	PT1
042-010142-000	1	Transformer	PN:PT-3034 CSW-10 230V/50Hz	PT1
061-001052-000	2	Knob w/white dot indicator	PN:49001-W (18teeth)D=15.1 H=14.5	R233,216
061-016001-000	3		φ16x14.8mm D TYPE P.P+TPR	for VR301-303
061-100016-000	3	Partition	PN:BCMS-8 L=8mm NYLON 66(UL)	Power PCB
061-314002-000	2	Strain Relief	P/N SB4F-2	PANEL,COVER
061-700044-000	2	Mica	13x18mm TO-220 holeless	for Q13,17
061-700090-900	2	Ceramic Gasket	16x21mm t=2mm alum. Oxide, wht	for Q11,15
062-252506-000	1	Bucket (CSW-10)	10"x10"x4.89" HIPS UL94 V0 blk	
063-010010-000	5	Bracket for IC	P/N:TRK-2	for Q11,13,15,17,TH1
063-252604-900	1	Panel	10"x10"x.0984" SPCC silver painting	
073-014084-500	1	Bracket	6.64"x3.5"x3.2" SPCC cadium plated	
074-020018-000	1	ROCKER SW (POWER)	PN:RF1003-BB4-0	SW4
082-022611-000	1	Wire set #26 UL1007	L=110mm blk+whtx6 XH7Px2	RABOS TO PRE
082-082620-000	1	Wire set #26 UL1007	L=200mm XH8Px2 Blk/wht	MAIN TO PRE
086-021836-000	1	Power Cord	SPT-2 #18 12feet+T187 sleeve	
181-911800-338	1	Wire set #18AWG UL1007	blk L=110mm Ring type	C211
181-921400-002	1	Wire set #14AWG UL1015	blk 625mm T205/T205(t=0.8)+ sleeve	SPE-
181-921422-002	1	Wire set #14AWG UL1015	red 625mm T250/T250+ sleeve	SPE+
181-921600-000	1	Blk Wire #16 UL1015	T187 transparent sleeve L:140mm	FUSE TO SW
181-921699-000	1	Wht wire #16 UL1015	T187 transparent sleeve L:160mm	FUSE TO SW

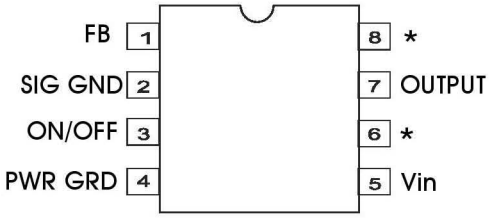
Integrated Circuit/Transistor Diagrams

MPSW56, 2N2709A, 2N5401

Q3,8,12,14,16,18

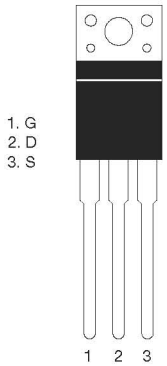


LM2574
U6



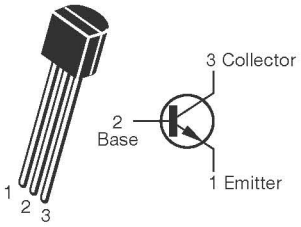
* No internal connection, but should be soldered to PC board for best heat transfer.

MOSFET IRF640
Q11,13,15,17



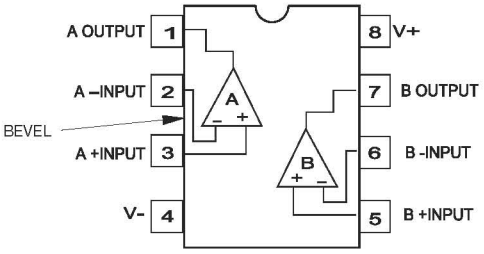
MPS2N222
MPSW06, 2N5551

Q6, 20-23,31

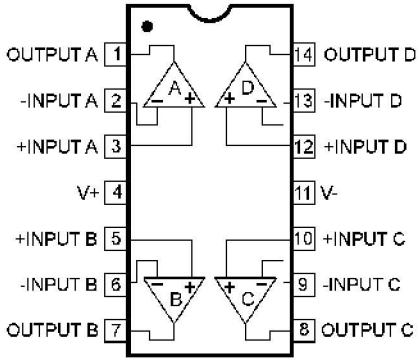


OPAMP, DUAL
TL072CDR SO-8,

U9,10,200-205,301

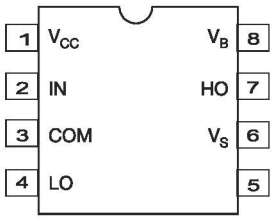


OPAMP, QUAD 14P DIL TL074
U300

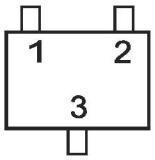


* MMBT3904LTI SOT23,
* MMBT3906LTI SOT23,
DTC114TK SMT3,
* MMBT5401 LTI,
* MMBT5551 LTI

IR2111 HALF-BRIDGE DRIVER
U7,8



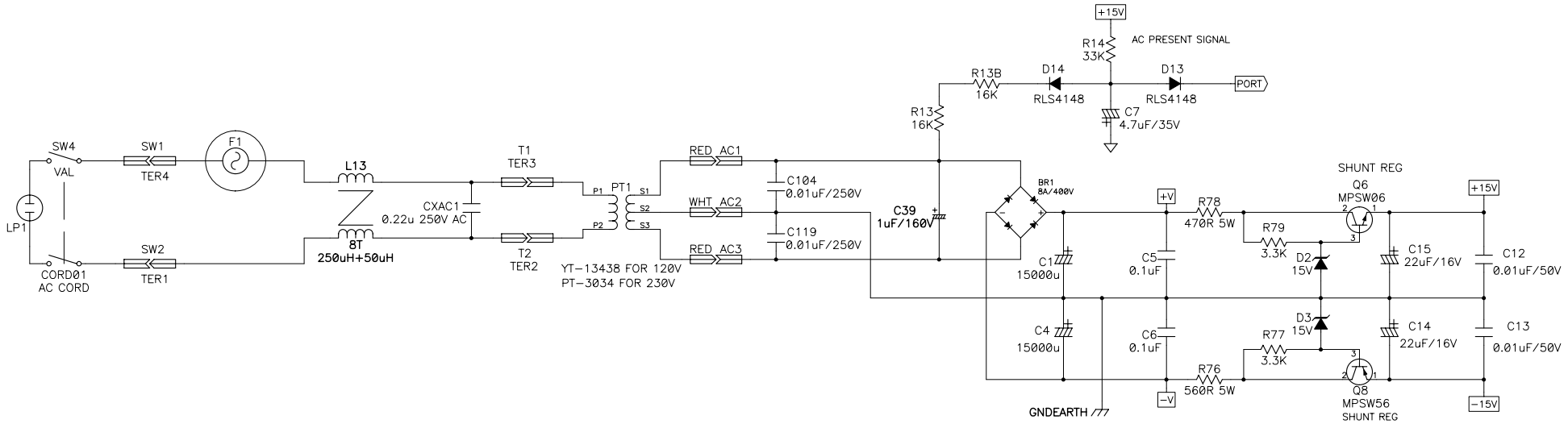
Q1,2,25-30, 32, 33-37, 40,50-52, 202-204

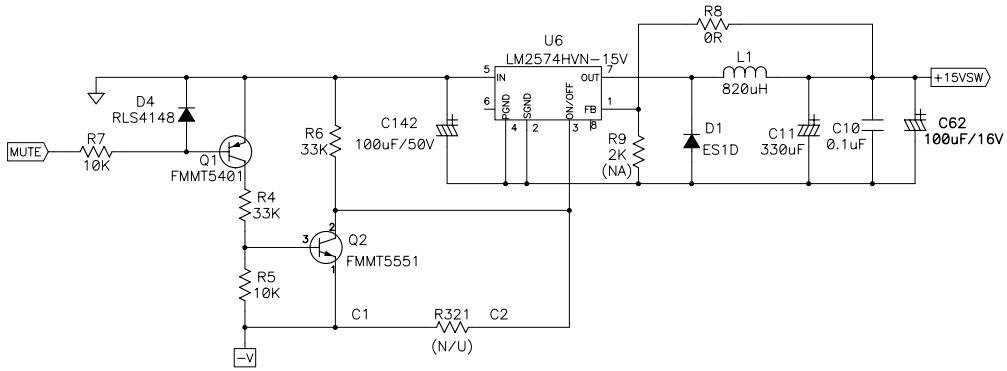


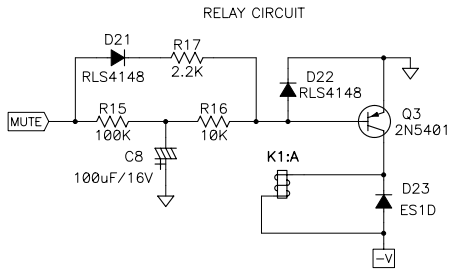
1) Emitter
2) Base
3) Collector

* PREFIX MAY BE "FMMT"

CSW-10

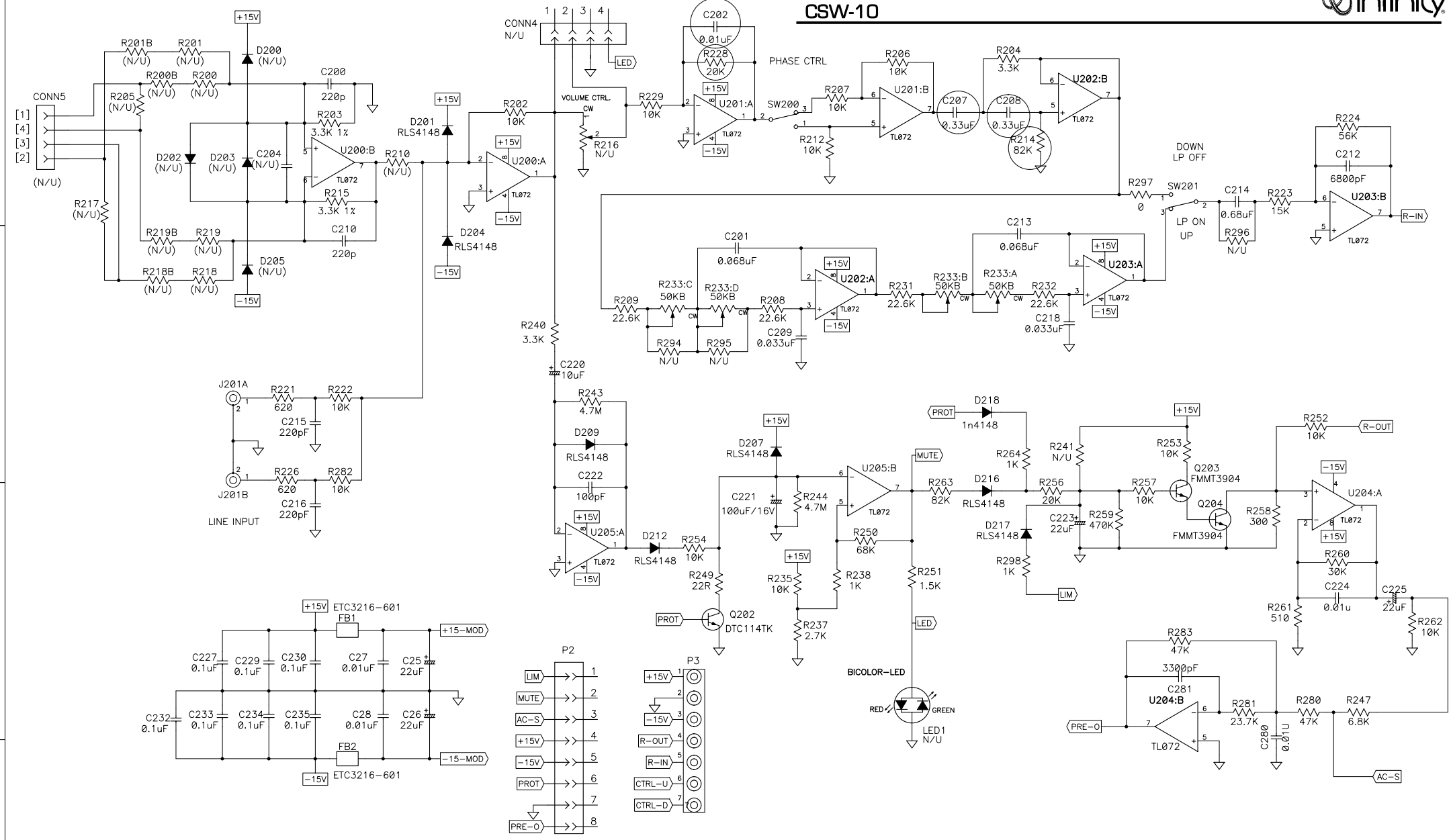






Rev:	Notes:	Date:	Rev:	Notes:	Draw by	Designed by	Checked by	Approved By	
01	New DESIGN	2004/01/29							Harman
02	CHANGE:F1,R169,R214,R228,C202,C207,C208 DEL:D90,D91	2004/03/16							: 416-03A0301-000
									Model no: CSW-10 120V
									Sch name: CSW-10-02.sch
									Issue no: ET-01-21-4783
									Date: 2004/03/16
									Sheet: 16 Rev: 02
									Size: A2 Author: Belle

CSW-10



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	Harman
:	416-03A0301-000
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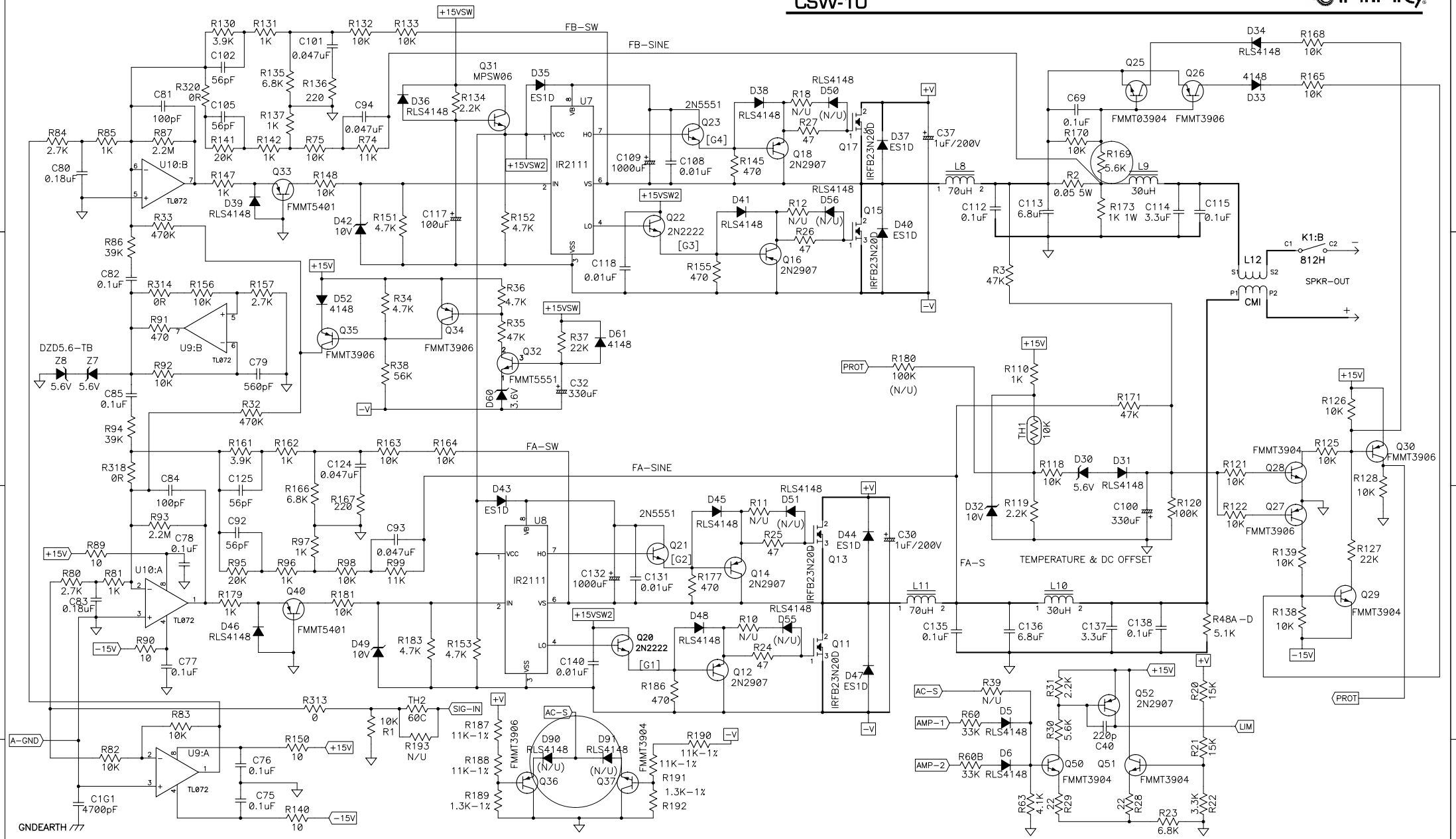
Date:	2004/03/16
Sheet: 17	Rev: 02
Size: A2	Author: Belle

CSW-10



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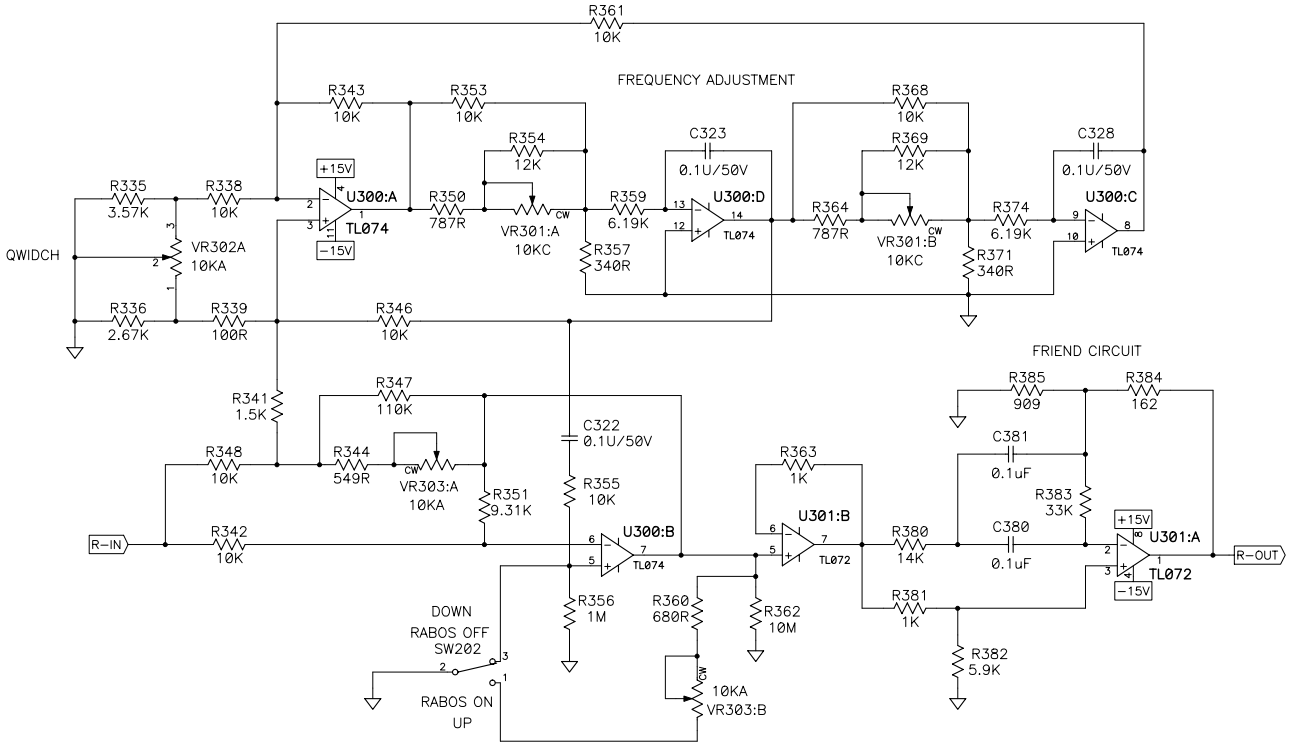
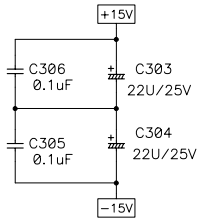
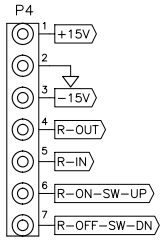
									Sch name: CSW-10-02.sch
									Issue no: ET-01-21-4783
									Date: 2004/03/16
				28					Sheet: 18 Rev: 02
									Size: A2 Author: Belle

CSW-10







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Harman	
:	416-03A0301-000
Model no:	CSW-10 120V
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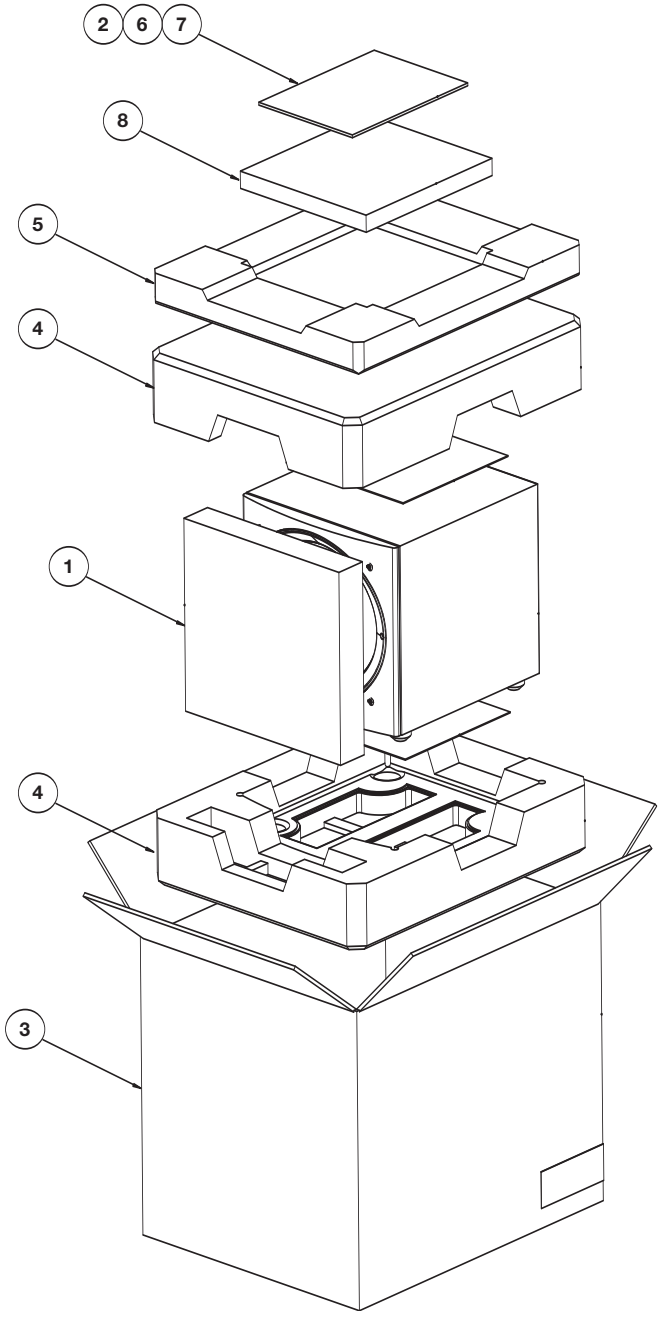
Issue no:	ET-01-21-4783
Date:	2004/03/16
Sheet:	19 Rev: 02
Size:	A2 Author: Belle

CSW-10

PACKAGING



ITEM NO.	DESCRIPTION	QTY.	PART NO.
1.	Grille Assembly, Frnt CSW-10 (Black)	1	352332-003
	(Beech/Cherry)	1	352332-004
2.	Owner's Manual CSW-10 (120v)	1	352519-001
	Owner's Manual CSW-10 (230v)	1	352519-002
3.	Outer Carton CSW-10 120v (Black)	1	352517-001
	Outer Carton CSW-10 120v (Beech)	1	352517-002
	Outer Carton CSW-10 120v (Cherry)	1	352517-003

ITEM NO.	DESCRIPTION	QTY.	PART NO.
3.	Outer Carton CSW-10 230v (Black)	1	352517-004
	Outer Carton CSW-10 230v (Beech)	1	352517-005
	Outer Carton CSW-10 230v (Cherry)	1	352517-006
4.	End Pad, Top & Bot CSW-10	2	352518-001
5.	Spacer Pad	1	353100-001
6.	Warranty Card, 3/5 Year, Infinity	1	352004-001
7.	Spike Foot Set	1	338076-001
8.	RABOS Kit	1	335852-003